Submission Greater Dublin Drainage Project

ABP ref: 312131

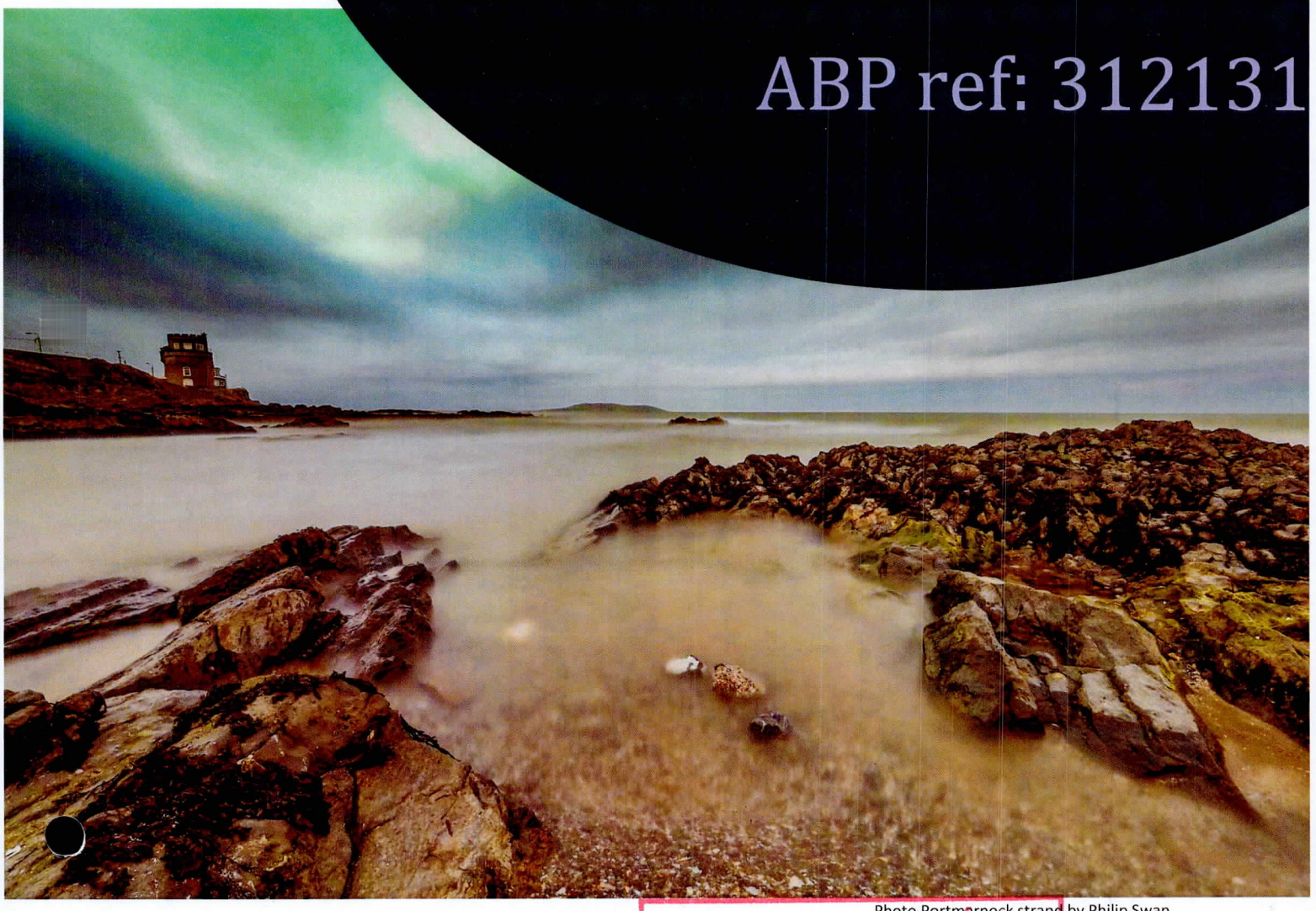


Photo Portmarnock strand by Philip Swan

Submission by:

Sabrina Joyce-Kemper
23 Portmarnock Crescent
Portmarnock
Co Dublin.

Date of Submission : 7th June 2024

Contents

Submission

1. Introduction

1.1 I, Sabrina Joyce-Kemper (SJK) have been a resident of Portmarnock, Co Dublin, for over twenty years and I swim regularly at Portmarnock Beach (North and South) and in locations such as Balscaddin and High Rock. I have an Advanced Diploma in Planning and Environmental Law from the Honourable Kings Inn and have a particular interest in the area of water quality and protection of water bodies. I work as a planning consultant with an emphasis on environmental law and habitat protection. I believe in rights of Nature and try to give a voice to species that do not have an independent voice to advocate for their protection. This submission while made in light of the issues personally and materially affecting me and my family, is concurrently made to try and give a non humancentric approach to protection and conservation for affected species. To be a voice for nature.

1.2 I have been involved in consultation in relation to the Greater Dublin Drainage Project (GDDP) since on or about 2012, when I made a submission in relation to the route selection of the project and scoping for the EIAR/AA (See Appendix 1.1). Many of the issues I raised were not comprehensively addressed or assessed in the planning application lodged in June 2018. I made a submission objecting to the development in August 2018 (See Appendix 1.2) and also to the addendum documents in October 2018 (See Appendix 1.3) I also made an appearance and submitted a brief of evidence at the oral hearing in March 2013 (See Appendix 1.4). In 2020, I successfully judicially reviewed the An Bord Pleanála (ABP) decision in 301908 which led to this remittal. In August 2022 I made a substantial general submission (see Appendix 1.5) on further and outstanding issues in relation to the application that had not been addressed in the Inspectors report for 301908 (quashed file).

1.3 In these appendices **1.1 – 1.5**, there are many issues raised that I believe have still not been addressed by Uisce Éireann(UE) or by the previous inspector Mairead Kenny (not Sarah Lynch who was on the minutes in error), nor by the Board members David Walsh, Chris McGarry (on one version of meeting minutes), and John Connolly and Maria Fitzgerald added on another version of meeting minutes.

1.4 The development is described on Pleanála.ie as follows:

Greater Dublin Drainage Project consisting of a new wastewater treatment plant, sludge hub centre, orbital sewer, outfall pipeline and regional biosolids storage facility

1.5 This submission is in response to further information submitted by UE after a section 37(F)(1)(a) and 37(F)(1)(c) request by the Board, in which EU updated the Planning Report, NIS and EIA (addendum versions) and drawings. I do welcome that the applicant took on board some of the lacunae, omissions and breaches of law that I identified in my Judicial Review and August 2022 submission, such as the statutory registration of the application on the EIA Planning Portal, further surveys, listing the experts on the EIAR to name a very few. We also welcome the opportunity to now be able to respond to the 301908 Inspectors report, UE's response to

submissions from January 2019 and briefs of evidence submitted during the approx 2 week oral hearing, which the public had previously not had the opportunity to have a right of response to.

1.6 The additional information and updates has raised further issues and considerations in terms of Environmental Impact Assessment (EIA) and Appropriate Assessment (AA) and compliance with updated provisions and statutory requirements of EU and national law. However most of the modelling, data inputs, and surveys are so dated that despite the applicant constantly stating that their EIAR was carried out in line with CIEEM Guidelines for Ecological Impact Assessment in the United Kingdom and Ireland, much of their data does not confirm or follow the CIEEM advice note on the lifespan of ecological reports and surveys (appendix 1.6). After careful consideration of the additional information submitted by UE, I still object to this planning application for the reasons, considerations and evidence put before the Inspector and the Board in this submission and attached appendices.

2. Combined Approach.

2.1 In accordance with the provisions of Section 37F(1)(c), ABP requested; *That you provide your **views** on whether the discharge of waste water from the proposed development, **in conjunction with existing discharge to the receiving waters**, would cause or exacerbate breaches of the combined approach (as described in the Waste Water Discharge (Authorisation) Regulations 2007 as amended). (bold emphasis added).*

2.2 Uisce Éireann's reply was as per excerpt below at Fig. 2.1 (the letter was only available in scanned format). The combined approach is a statutory assessment under the Water Framework Directive as such it is my opinion that ABP asked the wrong question of UE. Rather than asking for the applicants views, ABP should have requested a full and comprehensive assessment under the combined approach. It is very clear from the application documents submitted to date by UE that although incomplete identification of emission limits/ EQS etc are sometimes made, the applicant fails to actually carry out an actual assessment using factual data. There are also no final conclusions on what are the most stringent standards that need to be applied to any consent or brought forward to a waste water discharge licence (WWDL) application.

2.3 This reply clearly shows that Uisce Éireann have railed to give a detailed reply to the Boards statutory request under Section 37(F)(1)(c), instead referring the Board back to information that the Board had already reviewed before looking for further clarification of that information from UI. The Board clearly required a more detailed explanation of whether the combined approach had been properly assessed. UI have inexplicably sidestepped the request and instead implied that the approach they have already taken (here they refer to separate, non cumulative (combined) sections of the EIAR), which I believe to be an approach that is manifestly wrong and does not comply with the legal definition of "combined approach".

2.4 The "combined approach is defined in SI684 [1]of 2007 as follows:

"combined approach", in relation to a waste water works, means the control of discharges and emissions to waters whereby the emission limits for the discharge are established on the basis of ***the stricter of either or both, the limits and controls required under the Urban Waste Water Regulations, and the limits determined under statute or Directive*** *for the purpose of achieving the environmental objectives established for surface waters, groundwater or protected areas for the water body into which the discharge is made;* (emphasis in bold added).

In short, the answer is no. The more detailed answer is as follows: the EIAR for the Proposed Project (including the current EIAR Addendum) and the environmental assessments completed within have taken full account of all relevant statutory and non-statutory requirements, including the Waste Water Discharge (Authorisation) Regulations 2007 (as amended), the Urban Waste Water Treatment Regulations 2001 (as amended), the Water Framework Directive, European Union Environmental Quality Objectives (Surface Waters) Regulations 2009 (as amended) and the Bathing Water Quality Regulations 2008. These assessments considered the impact of the Proposed Project in combination with the existing baseline on established environmental objectives, as described in all relevant legislation, including discharges and emissions to waters.

Compliance with the *"combined approach"* is demonstrated as follows:

a) **Urban Waste Water Treatment Directive:** As the proposed discharge is not to a designated sensitive area under Article 6 of the Urban Wastewater Treatment Regulations 2001 (as amended), the only concentration limits that apply to the treated effluent discharge are as set out in Schedule 1 of these Regulations. The proposed discharge complies with these limits. This is as set out in Section 4.4.4 of Chapter 4 (Description of the Proposed Project) in Volume 2 Part A, and further described in the Key Wastewater Treatment Standards Report which is appended as Appendix A4.1 in Volume 3 Part B of the EIAR in the 2018 planning application.

b) **Environmental Quality Objectives**: The water quality modelling carried out demonstrates that the limits proposed for the discharge, having regard to the proposed discharge volumes and background concentrations, are sufficient to ensure that the receiving water will meet the requirements of the European Union Environmental Quality Objectives (Surface Waters) Regulations 2009 (as amended), as documented in Chapter 8 (Marine Water Quality) in Volume 3 Part A of the EIAR in the 2018 planning application, and as stated in Section 8.6 which specifically states that 'The extensive modelling undertaken as part of this EIAR demonstrates that the receiving water will meet good status criteria and will meet the environmental quality objectives for coastal water nutrients levels.' Chapter 8 (Marine Water Quality) in Volume 3 Part A of the EIAR in the 2018 planning application, as supplemented by Chapter 8A (Marine Water Quality) in Volume 3A Part A of the EIAR Addendum also considers the environmental objectives for relevant areas associated with the Bathing Water Regulations and the Shellfish Waters Regulations.

As a result, under expected operating conditions, the discharge of waste water from the Proposed Project, in conjunction with existing discharge to the receiving waters, will not cause or exacerbate breaches of the "combined approach" as set out in the Waste Water Discharge (Authorisation) Regulations 2007.

Figure 2.1 Uisce Éireann reply regarding assessment under the combined approach.

2.5 Section 42 of the Wastewater Discharge Regulations 2007 (SI 684 of 2007) states the following, in relation to transitional arrangements to prevent a combined approach assessment falling through the gaps of two competent authorities (ABP and EPA) :

(2) Where, following consideration under paragraph (1), the planning authority or the Board, as the case may be, forms the opinion that breaches of the combined approach would be caused or exacerbated, a permission or approval referred to in paragraph (1), which the authority or Board decides to grant, shall include conditions to prevent—

[1] S.I. No. 684/2007 - Waste Water Discharge (Authorisation) Regulations 2007 https://www.irishstatutebook.ie/eli/2007/si/684/made/en/print

(a) breaches of water quality standards established under national Regulations in relation to designated bathing waters, designated shellfish waters, areas designated for the protection of freshwater fish and areas designated for the abstraction of water intended for human consumption,

(b) a deterioration in the chemical or ecological status (or ecological potential as the case may be) in the receiving water body,

(c) a deterioration in the chemical status of the receiving body of groundwater,

(d) the input into groundwater of hazardous substances, or

(e) the exclusion or compromising of the achievement of the objectives established for protected species and natural habitats in the case of European sites where the maintenance or improvement of the status of water is an important factor in their protection.

2.6 There is a hierarchy to the combined approach which i have tried to illustrate with the main legislation covered by the combined approach (see fig 2.2) with the Habitats and Birds Directive being the overarching legislation to which a decision maker must assess any development or licence under the combined approach. As the sewage effluent for this development is discharged within a water dependant SAC / SPA that is designated for Harbour Porpoise, Reefs and Birds, even if the discharge does not exceed emissions limits, endanger shellfish waters, reduce the status of a water body, reduce status of a bathing water etc, if it impacts on Harbour Porpoise, Reefs or Birds in any way that would compromise those protected species, all bets are off and the development MUST be refused.

2.7 Áine Ryall (Professor at the School of Law, University College Cork and Chair of the Aarhus Convention Compliance Committee) summed up the legal position in Á Ryall, "Reviewing Science & Law in Member States' Courts: Enforcement of the Habitats Directive in Ireland"[2] as follows;

In Connelly, the Supreme Court explained that the 'overall conclusion' which must be reached before the competent authority will have jurisdiction to grant development consent following an appropriate assessment 'is that all scientific doubt about the potential adverse effects on the sensitive area have been removed'. There is also a separate obligation on the competent authority 'to make specific scientific findings which allow that conclusion to be reached.'

The Supreme Court identified 'four distinct requirements' which must be satisfied for a valid appropriate assessment determination to be taken:

***First,** the [appropriate assessment] must identify, in the light of the best scientific knowledge in the field, all aspects of the development project which can, by itself or in combination with other plans or projects, affect the European site in the light of its conservation objectives.*

***Second,** there must be complete, precise and definitive findings and conclusions regarding the previously identified potential effects on any relevant European site.*

---

[2] https://realaw.blog/2022/12/16/reviewing-science-law-in-member-states-courts-enforcement-of-the-habitats-directive-in-ireland-by-a-ryall/

Third, *on the basis of those findings and conclusions, the [competent authority] must be able to determine that no scientific doubt remains as to the absence of the identified potential effects.*

Fourth *and finally, where the preceding requirements are satisfied, the [competent authority] may determine that the proposed development will not adversely affect the integrity of any relevant European site. (bold emphasis added)*

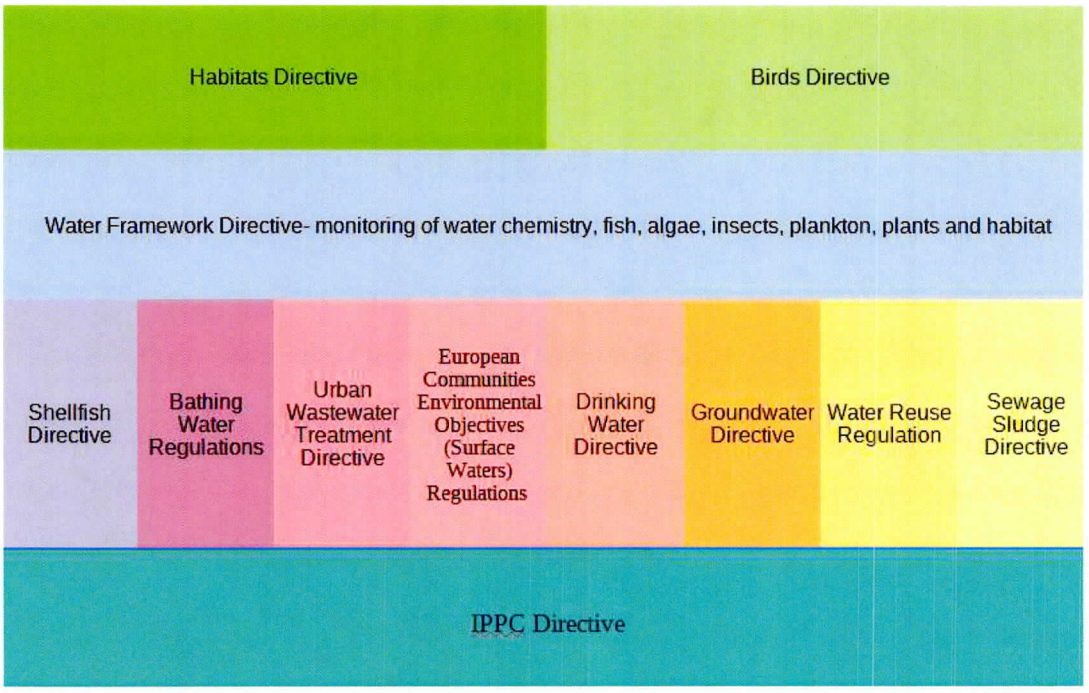


Figure 2.2. Hierarchy of Directives when assessing under the Combined Approach

2.8 Because this development engages the Habitats Directive & Birds Directive it also engages the Precautionary Principle which in turn feeds through to all assessments under Directives lower in the hierarchy. If the cumulative impact of discharges from this development with other discharges, in addition to existing ambient conditions, breach ANY of the statutory limits or standards in ANY of the Directives then ABP are precluded from granting the development.

2.9 The official EU-Lex defines the Precautionary Principle as follows:

The precautionary principle is an approach to risk management, where, if it is possible that a given policy or action might cause harm to the public or the environment and if there is still no scientific agreement on the issue, the policy or action in question should not be carried out. However, the policy or action may be reviewed when more scientific information becomes available. The principle is set out in Article 191 of the Treaty on the Functioning of the European Union (TFEU).

2.10 The concept of the precautionary principle was first set out in a European Commission communication adopted in February 2000, which defined the concept and envisaged how it would be applied. I have attached this communication at Appendix 2.1 so that lays out competent authorities responsibilities under this principle.

2.11 In order for ABP to carry out a legal assessment under the "Combined Approach" which also engages the Habitats and Birds Directives and the Precautionary Principle, it must be presented with the best scientific knowledge in the field, in order to be able to reach *complete, precise and definitive findings and conclusions where no scientific doubt remains as to the absence of the identified potential effects.* Based on the data currently provided by the applicant in this application, ABP cannot reach a conclusion where no scientific doubt remains. This is due to a number of reasons including;

- Severely out of date data and surveys, paucity of data in relation to identifying statutory limits in values under numerous directives and so failing to identify if combined discharges will breach said limits.

- A complete failure to accurately model the discharge for the GDDP

- Failure to submit data which indicates that the development will fail to comply with the protection of Shellfish Waters and specifically Razor Clam.

- Failure to cumulatively asses discharges and emissions to all water bodies and catchments affected by the discharges and emissions from the development.

2.12 In order to inform and complete a comprehensive assessment under the "combined approach" as mandated by the European Union's Water Framework Directive (WFD), involves identifying the interaction of both emission limit values for point sources and quality standards for water bodies, which are critical to achieving the environmental objectives set for water protection. In addition compliance with the provisions of All water related directives and Habitats and Birds Directives. Here's a proposed step-by-step process (not necessarily definitive as I am not an expert on Marine science) on how UE might carry out such an assessment:

2.12.1 Understanding the Legal Framework

a) Review the WFD: Understand the legal requirements and the goals set by the WFD, particularly Articles 10 and 16, which stipulate the combined approach of using both emission limits and quality standards. Identify all Directives that fall under the combined approach.

b) National Legislation: Review how these directives have been transposed into national laws and what additional requirements might be in place, or where there is a deficit in transcription.

2.12.2 Preliminary Data Collection

a) Water Body Identification: Identify the water bodies to be assessed and their current status. Water bodies that are within range of all discharges plumes with cumlative impacts must be assesed

b) Baseline Data: Collect existing data on water quality, sources of pollution (both point and non-point sources), and previous assessments. If Monitoring is not already in place as required by law then systems must be set up so data is available to carry out assessment.

2.12.3 Setting Up Monitoring Systems

a) Monitoring Network: Establish or improve existing monitoring systems to collect data on water quality parameters like chemical concentrations, biological diversity, and hydrological data.

b) Emission Sources: Monitor and record emissions from identified point sources to ensure compliance with emission limit values. This includes monitoring emission/ discharge overflows (CSOs) (SWOs) and quantity discharged from each point in a year.

2.12.4 Water Quality Assessment

a) Chemical Status: Assess the chemical status of the water body based on priority substances listed in the WFD.

b) Biological and Ecological Status: Evaluate biological elements (e.g., fish, macrophytes, phytoplankton) and ecological status based on biological quality norms.

c) Physical-Chemical Parameters: Measure temperature, pH, and other relevant physical-chemical parameters that influence water quality.

2.12.5 Risk Assessment

a) Risk Identification: Use the collected data to identify potential risks to achieving the WFD objectives.

b) Risk Evaluation: Evaluate the likelihood and potential impacts of these risks on water bodies.

2.12.6 Implementing Measures

a) Mitigation Strategies: Develop and implement strategies to reduce pollution, such as upgrading wastewater treatment facilities, diverting storm water from sewers, promoting best agricultural practices, or restoring natural water retention systems.

b) Emission Reduction: Ensure that emission limit values are met through technological improvements Best Available Technology (BAT),and Polluter Pays Principle, better management practices.

2.12.7 Public Participation and Stakeholder Involvement

a) Engagement: Involve the public and other stakeholders in the planning and decision-making processes, as required by the WFD.

b) Feedback Incorporation: Consider stakeholder feedback and local knowledge to refine assessments and management plans.

2.12.8 Reporting and Review: Document all findings, methodologies, and data used in the assessment. Provide clear Matrices of ambient baseline conditions in waterbodies and projected levels when the development is in construction/ operational not forgetting cumulative impacts with other discharges. Upload assessment to publicly accessible location to share information. (EIAR Portal/ WWDL Portal)

2.13 If UE were required to carry out a comprehensive assessment along the lines of the above, it would not only aid in compliance with the WFD fro this development but also supports sustainable water management by adapting to specific local conditions and incorporating scientific and stakeholder inputs effectively. The assessment can also be used to inform other projects and policies and creates and import knowledge base for water quality improvement measures.

2.14 Unfortunately this was not the approach taken by UE. Having reviewed the WFD assessment submitted after I requested it should be provided in Oct 2022 I note the following.

2.14.1 Pollution Prevention and Monitoring:

Under WFD requirements, Member States must monitor and control pollution from pipelines, pumping stations, and other infrastructure to prevent leaks and contamination, however the applicants WFD doc mentions that all pipelines, tanks, storage containers, and pump sumps will be designed to be watertight, and the pipeline will be designed and constructed to minimize the possibility of leaks, no reference to overflow points that are designed to overflow. No mention of monitoring at all.

2.14.2 Surface Water and Groundwater Status:

Under WFD requirements the directive outlines the need to achieve good surface water status, protect and enhance all bodies of groundwater, and prevent deterioration. However the UE WFD Assessment only loosely addresses measures for pollution prevention and maintaining the integrity of water bodies, though specific monitoring and status classification details are less explicit or non existent.

2.14.3 Chemical Status Monitoring:

Under WFD requirements monitoring of chemical status for compliance with established standards is required, with specific parameters such as oxygen content, pH value, conductivity, nitrate, and ammonium to be monitored. Unfortunately the WFD document does not explicitly list the monitoring of these specific parameters but indicates an overall commitment to pollution prevention and maintaining water quality. For instance as an example the parameters put forward for the WWDL for pH are 6-9, where the shellfish directives stipulates 7-9 so just comparing those two directives under the combined approach should have directed a new standard for WWDL of 7-9. (ambient monitoring currently shows a pH of 8 for HA09).

2.14.4 Standards/ parameters assessment and comparison

Under Articles 10, 16 and Annex IX there are a number of Directives with associated standards and limits legislated for, however the applicant failed to list all directives and mandated

parameters/ standards/ELVs/ EQS for those directives and compare them to the substances and parameters/ standards applicable to / contained in the discharge plume, mixing zone and receiving waters when development is operational.

2.14.5 Presentation and Reporting:

Under WFD requirements Member States must provide maps illustrating the status of water bodies and indicate any failures to achieve good status due to non-compliance with quality standards. The applicants WFD Assessment document does not have detailed maps or detailed status reporting for impacted water bodies as required for complete assessment. A number of impacted water bodies are also excluded.

2.15 While the applicants WFD report document shows a basic general understanding of and commitment to pollution prevention and the integrity of water infrastructure, it lacks explicit details on specific monitoring parameters, the presentation of monitoring results, and the classification and reporting of water status as mandated by the WFD, modelling of standards and substances in operational discharge (cumulative impact with existing discharges). Essentially it identifies the requirements of the WFD well but then doesn't comply with them. Therefore, while the applicants WFD Assessment report aligns with some requirements, it does not fully comply with all detailed requirements of the WFD necessary for an assessment of a project of this nature.

3. Data Gaps in Application.

3.1 There is quite a substantial amount of data gaps that need further submissions from UE to shore up this application. I am disappointed and frustrated that UE took a very basic approach to updating this application. From reading the addendum documents it appears that the applicant contends that the only new components of the consent application are the UV treatment process and building and the extended culvert.

3.2 When in the High Court in April 2021 arguing for the Court to quash decision 301908 outright rather than remit to the Board , one of the reasonS we gave was the need for precise, definitive and up to date scientific data. At that stage the majority of surveys and data was already not reliable due to ageing out. The Board and Uisce Éireann argued that the development was too big to fail and it could not be delayed any further. Remittal was granted and then ABP proceed to sit on the application for over 18 months until December 2022 when i pointed out on social media that the file had still not been given a new case no. The next day the file was given a case number and in 2023 Board requested general submission from observers.

3.3 Although there was no new data to review we did make submissions based on having the time to review the dated application and from receiving new information via AIE requests. I made a substantial if less organised submission (appendix 1.5) where I raised a number of issues including authorised development (Section 34 (12) issues), dated surveys, modelling excluded from the application (that to date was never submitted by the applicant) that indicates serious impacts to Shellfish waters. The Board have in the interests of Justice requested the info that makes up the 2nd Addendum from Oct 20203 which took a further length of time to submit. However the Board have made no comment on the serious issues raised in my submission

especially in relation to their obligations under Section 34.12 of the Planning and Development Regulations 2000 to present, when unauthorised development has been identified.

3.4 The Board also failed to specifically request a response from the applicant to submissions made in 2022 but UE have indicated in the EIAR that they will produce a response to submissions report at a later date. It would have been preferable if that response to submission report had made up part of these addendum documents in the interests of justice.

3.5 Doldrum Bay: While this application was in train the Applicant was informed that the EPA was carrying out a statutory review of the Ringsend Licence under reference D0034-02. Their was an attempt to co- ordinate a consultation by the EPA and ABP, which failed as neither the EPA or ABP addressed the illegal raw sewage discharges of the Doldrum bay secondary discharge point under AA or EIA nor combined outfall discharges. This is despite submission by me under ABP 315902 and to the D0034-02 licence review requesting that the continuous discharge of raw sewage beyond the licence condition date of 2012 be assessed. As no AA has been carried out on the significant affect from the raw sewage discharges, I have been given no option to take a Judicial Review of the ABP 315902 decision which is now live in the High Court. It was noted by ABP that their were different EIARs submitted for each application (Ringsend WWDL & 312131).

3.6 As it stands the Doldrum Bay Project will not prevent raw sewage discharges to Dublin Bay if it does go ahead as a number of houses and all overflows will still discharge via the same outfall pipe. The development also requires works to the cliff face and pipeline which are within the Howth Head SAC (See Figure 3.1). The historical raw sewage discharges and the proposed construction and operational impacts of the Doldrum Bay discharges and new infrastructure need to be assessed as part of a AA cumulative impact assessment for this case file. It was irrational for Doldrum and Howth Head SAC to be omitted/ screened out from the assessment when I have consistently raised the need to assess historical and future impacts. The Howth Head SPA would also interact with the Doldrum Bay impacts and needs to be screened in.

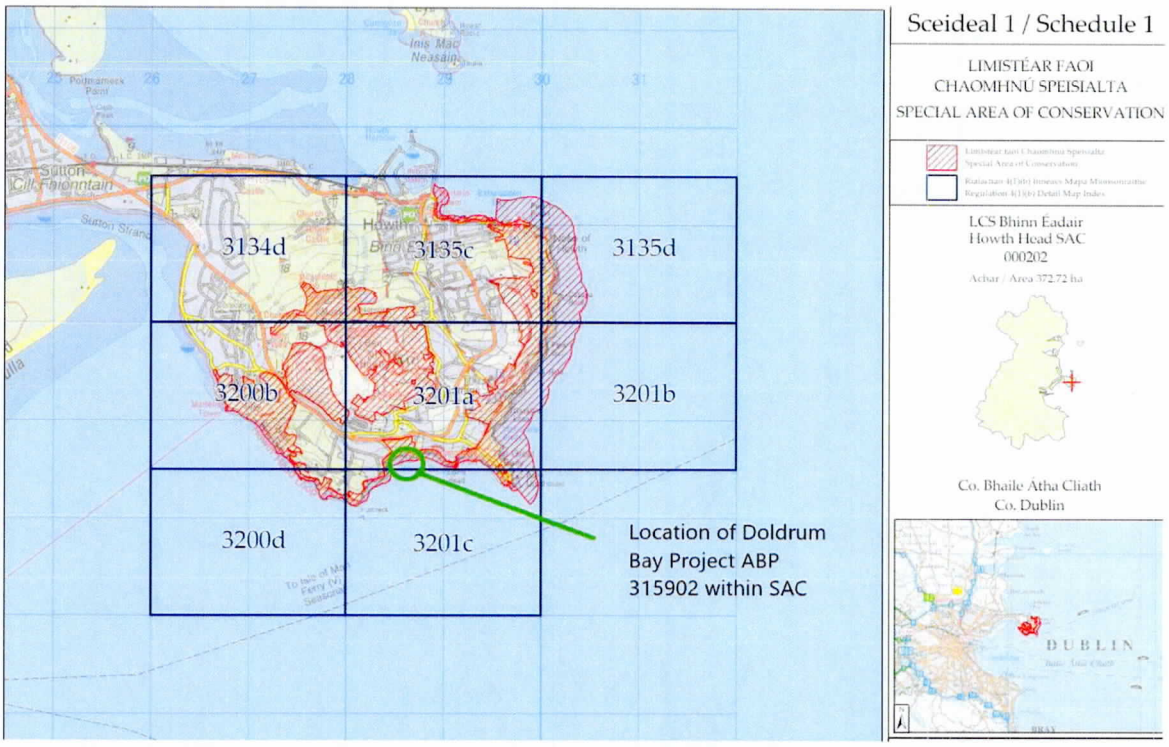


Figure 3.1 Location of Doldrum Bay discharge and development site 315902 within SAC.

3.7 It should be noted that the Doldrum Bay discharge which at this moment in time is constant was never modelled in any of the water quality modelling assessments and so the modelling is flawed from the outset. The applicant also failed to correctly model nd therefore assess the discharges from CSOs, SWO's, Rivers, Waste water Treatment Plants and Pumping Stations as required by the WFD. I have laid out the reasons for my claim below;

3.8 **Marine Modelling:** The applicant has updated the Marine Water Quality Chapter(Vol 3A Part A Chapter 8A) somewhat and the EIAR is now made up of both reports with some aspects of the addendum report 8A replacing the original report and some previous dated conclusion in chapter 8 being maintained. This mish-mash method of updating the EIAR is repeated throughout the addendum documents which makes reviewing them very difficult. It will also mean that it will be near impossible to decipher what has received consent and what has been supplanted when it comes to complying with the planning consent under the standard ABP condition 1 which is below in a general form.

1. The proposed development shall be carried out and completed in accordance with the plans and particulars lodged with the application and the information contained in the Environmental Impact Assessment Report, including the appendices which were submitted to the Board on the 13th day of September 2018 and October 2023 and the information contained in the Natura Impact Statement, as amended by the further details submitted at the oral hearing, and addendum documents submitted October, except as may otherwise be required in order to comply with the following conditions. Where such conditions require details to be agreed with

the relevant planning authority, the developer shall agree such details in writing with the relevant planning authority prior to commencement of development. In default of agreement, the matter shall be referred to An Bord Pleanála for determination and the proposed development shall be carried out and completed inaccordance with the agreed particulars.

Reason: In the interest of clarity.

3.9 It also means the consent may be impossible for a reasonable person or competent authority to follow and interpret and therefore be legally unsound if the decision unimplementable due to irrationality and conflicting information incapable of being enforced. This is an issue the Board require legal advice on. In my opinion as a reasonable person with an Advanced Diploma in Planning and Environmental Law, the application in its current form is not capable of being interpreted and enforced in compliance with the Law by me never mind an ordinary member of the public. There are conflicting drawings (e.g outfall route via compound 10.) And a new application that details only plans , reports, drawing and particulars that are up to date and have no conflicts be submitted after this application is refused. I may be wrong but I believe the Inspector requested a stand alone document of all amendments in place at the end of the oral hearing but i cannot locate such a document.

3.10 From what I can make out when comparing and combining the 2018 Marine Water Quality Chapter 8 and the New Chapter A is that the modelling was never sound in the first instance and as it is still the modelling informing the project cannot be sound 13 years later. The issues relating to the modelling were dealt with in part by Catherine McMahon in her submission in 2022, which I adopt (without prejudice) but below I have laid out the reasons why the modelling can not be relied on as it does not comply with the need for up to date, precise and definitive scientific information that any assessment engaging the Habitats Directive requires.

3.11 Chapter 8A list the modelling reports relied for this application they are:

MarCon (2011). Alternate Site Assessment Numerical Modelling Report, GP201103_doc001_04.

MarCon (2013). Alternate Site Assessment Numerical Modelling Report: Near Field Dilution and Mixing, GP201103_doc003_02

MarCon (2015). Greater Dublin Drainage, Model Development and Calibration, G1402_doc009_01

Intertek (2023). Uisce Eireann Greater Dublin Area Agglomeration WWDL Review Water Quality Modelling Assessment, P2612_R6177_Rev2 | 07 July 2023

3.12 The Intertek 2023 report is not submitted at all for the Board or observers to review. If they are relying on data from this report then the report should be submitted in its entirety as an appendix. It could be important for a cumulative impact assessment. Until it is it cannot be relied upon and I have marked it yellow at 3.11 above as it was "not before the Board".

3.13 The Marcon (2013) is referenced and relied upon in EIAR but again was never put before the Board. As the Inspector, The Board and observers cannot view this report and confirm the

interpretation of the outcomes it cannot be relied upon I have marked it yellow at 3.11 above as it was "not before the Board".

3.14 There appears to be two versions of the MarCon (2015) Greater Dublin Drainage, Model Development and Calibration report G1402_doc009_01 and G1402_doc001_01. The only report that was submitted was verison G1402_doc001_01 as appendix (3B) A8.1. If the version G1402_doc009_01 exists (and is not a typo) then a copy of this updated report should be put before the Board (and observers) for review. It cannot be relied upon if it is not. We can only assess and review the G1402_doc001_01 version that was submitted, as such we have marked G1402_doc009_01 in yellow above at 3.11 as it was "not before the Board". This document seeks to confirm the Marcon 2011 Model Development and Calibration.

3.15 So none of the modelling reports listed in the EIAR Vol3A Chapter 8A were actually submitted to the Inspector, The Board and Observers to review. This is a serious lacunae. I obtained a copy of Marcon (2011) GP201103_doc001_04, which I have attached at appendix 3.1. Having reviewed it *I* have identified a serious problem.

3.16 The modelling in this baseline report from 2011 was NOT modelled on actual discharge point which is the subject of this application, it was modelled on discharge point 72 (see Fig 3.2) which is further out to sea in deeper waters with faster currents than the discharge location that is the subject of this application. The Inspector and the Board could never know this, because the applicant never actually submitted the MarCon 2011 report(s). The foundation of all of the modelling and impact assessments for EIAR and AA is fatally flawed as it is does not meet the requirement for precise and definitive scientific information engaged by the Habitats Directive.

3.17 As can be seen from Appendix 3.1 the MarCon 2011 modelling chose to model the solute plume in deeper faster waters to the East of Ireland's Eye. The actual discharge location that is the subject of this planning application is closer to discharge point 66 in the MarCon 2011 report, but this was not modelled. In this report you can see the Discharge plume from the incorrect location does impact Bathing Waters, Shellfish Waters (designated and specified zone) however the data is not site specific to the actual discharge point location.

3.18 To visualise this I took a section from the 312131 drawing PROPOSED OUTFALL PIPELINE ROUTE (MARINE SECTION) - Sheet 2 of 2 - 32102902-2108P01 that I overlaid with Figure 9 of the MarCon(2011) to match identifiable points on the North of Ireland's Eye to show the discrepancy in relation to the modelled point 72 from Figure 9 of the Marcon(2011) report to the actual discharge location (Figure 3.3) It should be noted that figs 11 on in the MarCon(2011) illustrate that there are greater impacts at discharge point 66 which is closer to the actual discharge location than at discharge point 72.

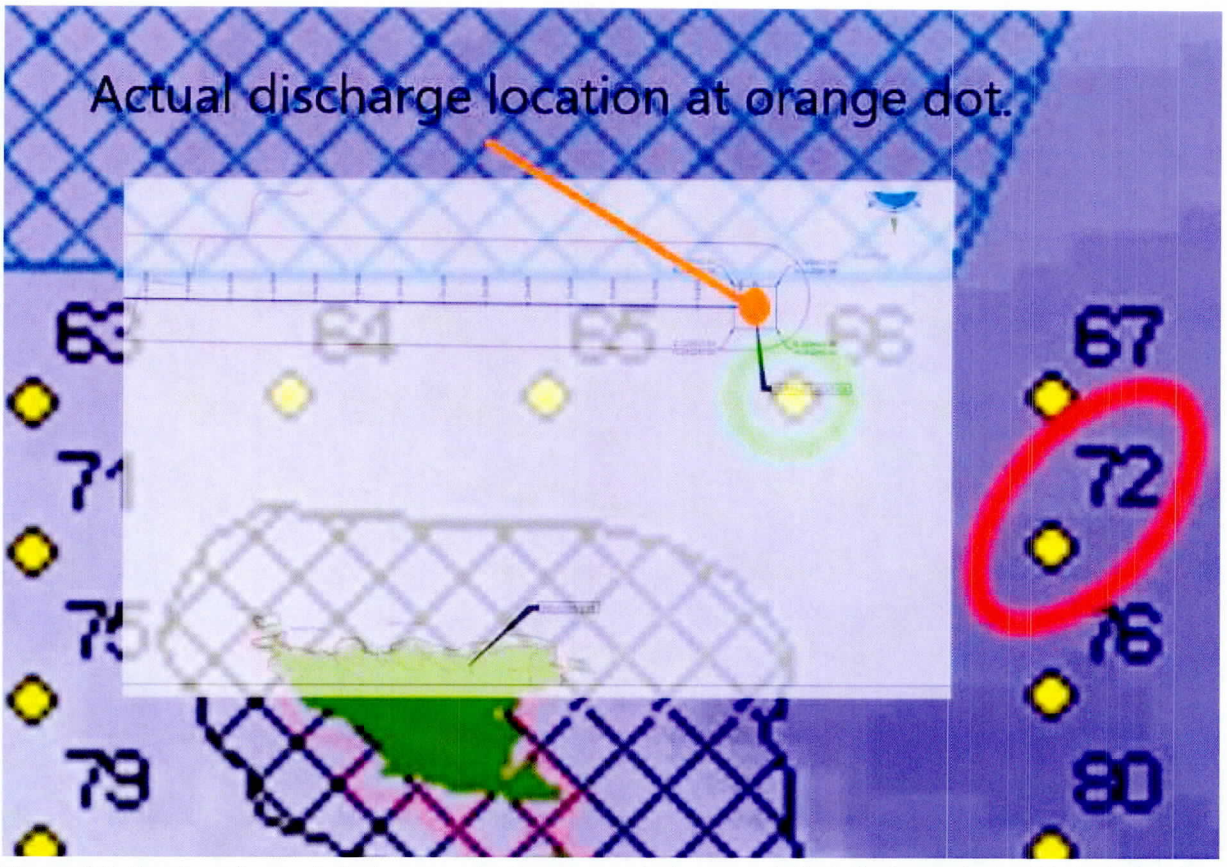


Figure 3.2 Overlay of actual discharge point in orange circle to modelled discharge Point 72 circled red.

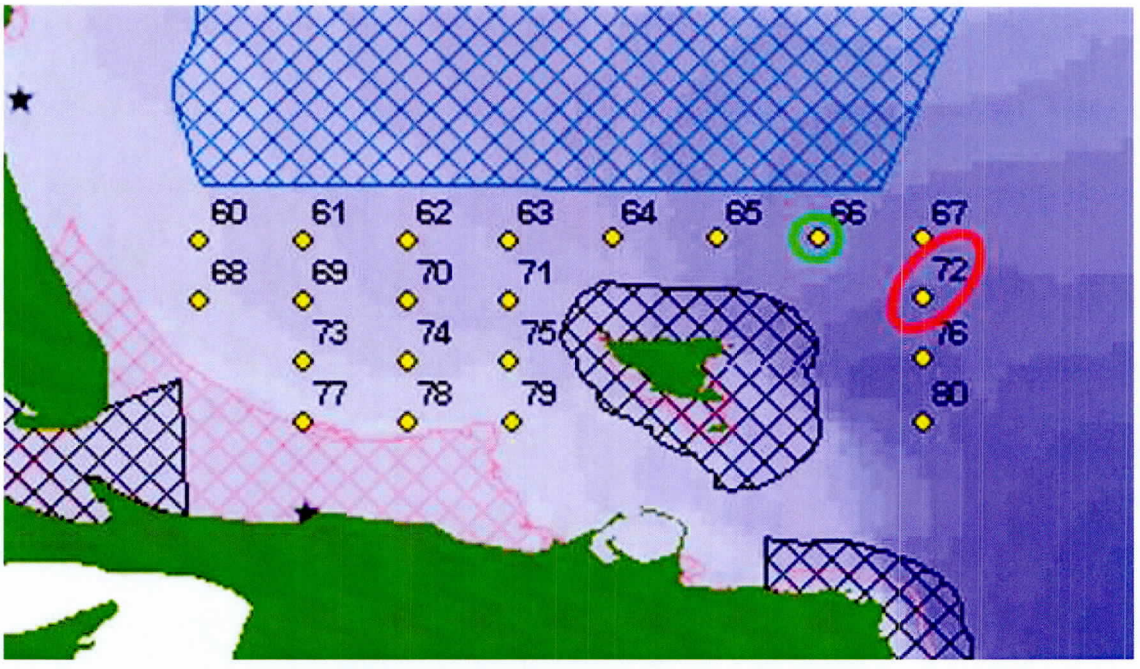


Figure 3.3 (Fig 9 MarCon 2011)– The red circle is discharge point 72 the Green discharge point 66.

3.19 As I have identified the whole foundation of the modelling is fatally flawed and actual impacts have not been accurately assessed in EIAR/ NIS . None of the modelling data in relation to ELVs/ EQS such as ecoli/ salinity / and all other parameters that must be identified and assessed under the combined approach are valid. As it stands the assessments in EIAR/ NIS / WFDR represent a better case scenario than if the modelling had used the actual discharge location.

3.20 Even so with the better case scenario of Discharge point 72, I had identified further issues with the modelling process.

3.20.1 Even with the amendments in Chapter 8A many of the input data is dated for example the original data on river Hydraulic flows was from the 1980's -1990's. Only two were updated in the 8A water modelling report. The original 8 A data also relies on the methodology in the Ringsend application water quality report, which in my inexpert opinion is a far superior assessment to the GDD report. While also dated (2018) it compiles the relevant info a more comprehensive namer and does model the GDD plumes is some of it scenarios. When new modelling for the actual discharge pipe is carried out, I would like to see it done by DHI who seem to be the top of their field with the Best Available Technology in software modelling.

3.20.2 The data inputs in relation to WWTPs all appear to have been from Annual Environmental Reports (AERs) dated 2019/2020 which is not up to date. There are more up to date figures available on the 2022/ 2023 AERS. The quoted Ringsend Figure for Hydraulic flow m3/s is lower that that quoted in the 2022 AER. I image that is across the board. The report was prepared in Oct 2023 those figures should not have been taken from 2019.

3.20.3 There is a paucity of data relating to quality sampling for Intestinal Enterococci in the inflowing rivers, and therefore, concentrations were estimated. This method is not robust as accurate levels must inform the model to enure statutory bathing and shellfish limits are not breached.

3.20.4 the River Pollutant Loads Defined in the Numerical Model in Chapter 8 (table 8.9) Figure 3.4 were all assigned the excellent status load of 250cfu/100ml for Ecoli as no data was available, which was a highly inappropriate methodology when ecoli modelling is so central to a sewage discharge application. I welcome the fact that the applicant have updated the loads for ecoli and other pollutants in table 8.4 of the new chapter 8A (Figure 3.5), but would question why there no water quality sampling has been undertaken for Intestinal Enterococci (IE) in the inflowing rivers, and therefore, concentrations were estimated. IE is a parameter of the Bathing water Directive (Regulation in Ireland) and so accurate modelling and assessment is vital to this application.

3.20.5 The applicant did not update the ambient concentration which were sourced from the most EPA sampling records for the period 2006 to 2013. This data is completely out of date and so there is no accurate baseline contrary to the requirements of the EIA and Habitats Directives.

3.20.6 Bed sediment composition was only bored to 5 metres but drawings submitted with the application identify dredging to 10 -12 metres near the interface so this data is not complete. There is no discussion of accumulated historical pollutants in the sediment that may be dispersed during dredging and that impact on marine life bioaccumulation.

Table 8.9: River Pollutant Loads Defined in the Numerical Model

River	Dissolved Inorganic Nitrogen (DIN) (mg/l N)	Molybdate Reactive Phosphate (MRP) (mg/l P)	Biochemical Oxygen Demand (BOD) (mg/l)	Escherichia coliforms (COLI) (/100ml)
Dodder	1.290	0.029	1.00	250
Camac	1.328	0.036	1.50	250
Liffey	2.555	0.052	1.50	250
Tolka	1.674	0.045	1.00	250
Mayne	2.210	0.090	5.00	250
Sluice	2.199	0.097	3.00	250
Ward	2.730	0.120	2.00	250
Broadmeadow	2.309	0.121	2.00	250
Turvey	1.890	0.070	1.50	250
Ballyboghil	3.067	0.179	1.00	250
Ballough	2.937	0.157	2.00	250
Mill	6.175	0.070	2.00	250
Santry	1.962	0.056	2.00	250
Elm Park	0.000	0.000	0.00	250
Trimlestown	0.000	0.000	0.00	250

Figure 3.4 Original EIAR Marine water quality, Chapter 8 (table 8.9)

Table 8.4: Updated River Pollutant Loads Defined in the Numerical Model

River	Dissolved Inorganic Nitrogen (DIN) (mg/l N)	Molybdate Reactive Phosphorus (MRP) (mg/l P)	Biochemical Oxygen Demand (BOD) (mg/l)	Escherichia Coliforms (COLI) (mpn/100ml)[1]	Intestinal Enterococci (IE) (mpn/100ml)
Dodder	1.291	0.031	1.32	2000	600
Camac	1.549	0.048	1.75	2000	600
Liffey	2.468	0.046	1.07	2000	600
Tolka	2.000	0.104	1.56	3880	1164
Mayne	1.938	0.080	1.78	3869	1161
Sluice	0.932	0.068	2.70	3174	952
Ward	3.496	0.140	1.69	6017	1805
Broadmeadow	4.719	0.321	9.87	10306	3092
Turvey	2.895	0.158	3.38	4150	1245
Ballyboghill	3.077	0.153	1.70	4342	1303
Ballough	3.111	0.128	1.76	1971	591
Mill	5.945	0.105	2.79	1722	516
Santry	2.373	0.105	2.81	1239	372
Elm Park	0.000	0.000	0.000	2000	600
Trimlestown	0.000	0.000	0.000	2000	600

[1] mpn/100ml is the most probable number of colony forming units (cfu) /100ml based on the multiple tube method for enumeration

Figure 3.5 Addendum EIAR Marine water quality Chapter 8A (table 8.4)

3.20.7 I cannot see the DIN parameters that were input into the model not the evidence they were based on. The model scenarios shown in Both 8 and 8a were run in 2015 so are dated. Even so the applicant states that in some scenarios the DIN exceeds the limits required to achieve high status class for a water body. This then would indicate that there is a real risk that this development will cause the HA 09 Irish Sea water body to drop by a class. The law is very clear that is a development will result in a drop in class of an EQS the it cannot be consented. I attained the summary physical and chemical assessment for HA09 from the EPA (Figure 3.6) detailing the latest assessment and value that must be maintained under the WFD. If there is the potential for any of the EQS to fall the development cannot be granted.

SELECT WB HERE			Not Eutrophic				NOTE ASSESSMENT IS BASED ON MOST RECENT 3-YEAR DATASET in 2016-2021					
Irish Sea Dublin (HA 09)	TSAS Status		Unpolluted									
			EQS		n/a		EQS		n/a			
	WFD EQS Status		DIN	conf	MRP	conf	DO	conf	BOD	conf		
CW	High		High	100	High	100	High	100	High	100		
IE_EA_070_0000				100%		100%						
Median Salinity	TSAS Threshold		Concentr	Pass/Fail	TSAS Cr	Score	Pass/Fail	Within 15%		% Exceedance		
33.7	Winter DIN	0.378	0.159	Pass	A Winter	Pass	Pass	0.321		-58		
	Winter MRP	42.000	22.000	Pass				35.700		-48		
33.2	Summer DIN	0.378	0.044	Pass	A Summe	Pass	Pass	0.3213		-88		
	Summer MRP	42	7.800	Pass				35.7		-81		
	Chloro. Median	10.6	1.500	Pass	B Chlorop	Pass	Pass	9.01		-86		
	Chloro 90 percentile	21.1	1.900	Pass				17.935		-91		
	Chloro. FL Median	5.3	3.755	Pass				4.505		-29		
	Chloro FL 90 percentile	10.55	7.919	Pass				8.9675		-25		
	DO%sat 5 percentile	79	99.475	Pass	C DO	Pass	Potential	90.85		-26		
	DO%sat 95 percentile	121	106.0	Pass				102.85		-12		
	BOD	4	1.000	Pass						-75		
	Opportunistic algae	0.6	ND									

Summary Stats	Salinity ‰	Temp. (C)	pH	Secchi	DO % Saturatio	B.O.D. (mg/l)	TON mg/l	NH3 mg/l	Free NH3 mg/l	DAIN mg/l	PO4 µg/l
MINIMUM	29.00	11.1	8.0	1.8	99.0	0.5	0.01	0.01	0.001	0.02	2.5
MEDIAN	33.2	14.7	8.1	2.6	103.2	0.5	0.02	0.03	0.001	0.04	7.8
MAXIMUM	33.6	17.9	8.2	4.5	107.1	1.1	0.04	0.06	0.002	0.08	17.0
No of samples	*36*	*36*	*36*	*36*	*36*	*26*	*36*	*36*	*36*	*36*	*36*

Figure 3.6 EPA summary Physical and chemical assessment for HA09

3.20.8 In relation Chapter 8A and MPN/ BOD, the applicant states that all coloured area represent a breach of the limit however the 2015 modelling has a grey colouring listed as "undefined" on the legend. Can the applicant expand on what undefined means and how it is a breach of the limit which in addition to the defined breached would again contribute to a deterioration of another EQS for the HA09 waterbody, precluding the Board from a grant of planning consent. This appears to be the case as the applicant states the modelling meets good status when in both EQS the water body is current at high status.

3.20.9 The fact that the applicant failed to carry out assessment of EQS against Annex 1 of the Directive at all is a gaping lacunae. UE should have this data available as on the basis of the information collected in accordance with Articles 5 and 8 of Directive 2000/60/EC, under Regulation (EC) No 166/2006 and other available data, Member States shall establish an inventory, including maps, if available, of emissions, discharges and losses of all priority

substances and pollutants listed in Part A of Annex I to this Directive for each river basin district or part of a river basin district lying within their territory including their concentrations in sediment and biota, as appropriate.

3.20.10 The flawed model shows breaches of coli (Escherichia) in a scenario, and does not model for Intestinal Enterococci. However it should be noted that this model is from 2015 using flawed 2011 location. The model was run before the input were updated for River flows, Riverine ecoli concentrations, WWTP outputs. This in fact can be said of all of the model issues raised in this section of my submission. While I have shown that the dated model runs (in the wrong location) will have an impact under the WFD that precludes consent, I suspect that if a model from the actual discharge point with the updated data in chapter 8A would show an even more deteriorated situation, and if the applicant had to update all ambient data, use data on 2022 AERs rather than 2019/2020, up to date river hydrology data, and had to identify and apply the consent to the most sensitive standards/ ELVs and EQs under the Combined approach, then it would be even more apparent that this development cannot discharge to this location.

3.20.11 The combined approach assessment carried out only consider riverine and WWTP primary discharge impacts, but Combined Sewage overflows (CSO's and Storm Water Overflows SWOs) along the project route and upstream of the project route that will become part of the GDD agglomeration, must also be modelled and assessed for impacts of discharges on waterbodies. Particularly when looking at heavy rain and process failure scenarios. The data is readily available to UE via their drainage area plans and AER information submitted yearly to the EPA. At figure 3.7 below Is a screenshot of UWWT discharges mapped on the EPA GIS viewer as an example.

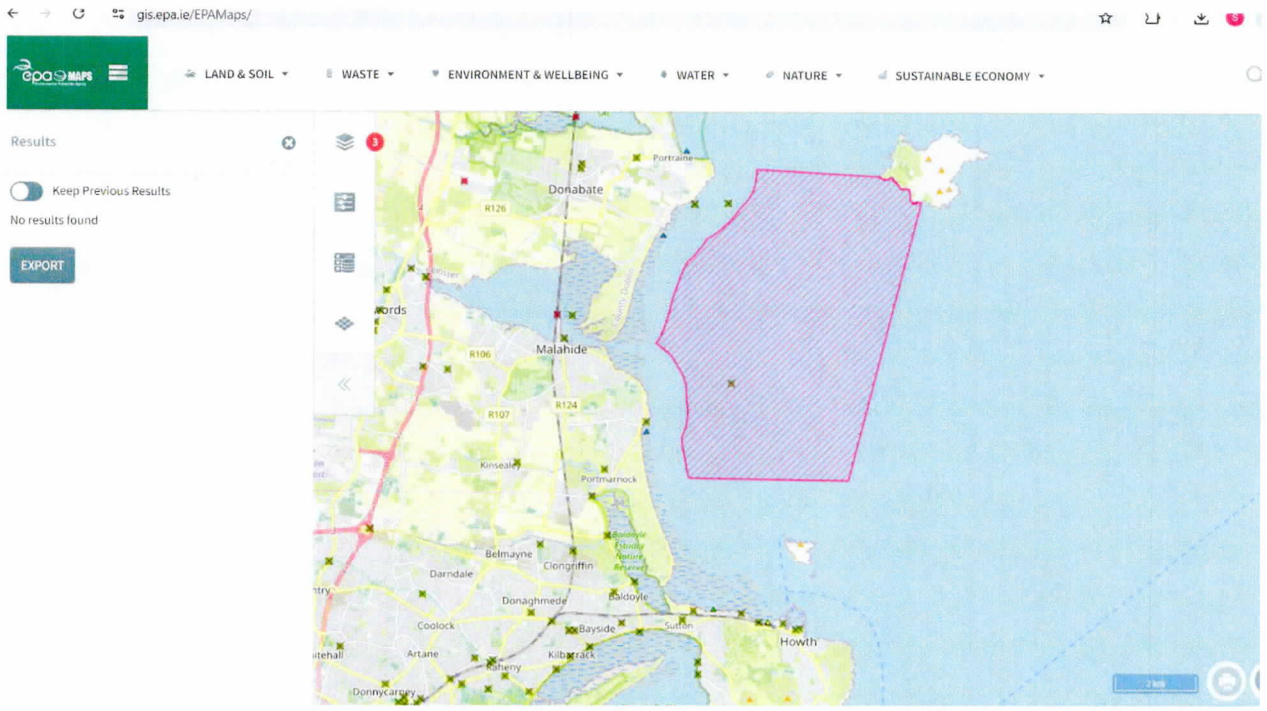


Figure 3.7 – Screenshot of EPA Map discharge locations at souther outfall location.

3.20.12 It is at this point that I mustpoint out that this waterbody HA09 where the outfall will discharge raw sewage, is intertwined with a number of water dependent and protected SACs/ SPAs and so the Habitats and Birds Directives are engaged. This means that a full assessment under the combined approach engaging the Habitats and or Birds Directives is the competent authority's responsibility to carry out the combined approach assessment based on best available information, objective criteria, best scientific knowledge and expert judgement in relation to its impact on the integrity of a NATURA2000 site with respect to the conservation objectives of the site and to its structure and function. There should be no reasonable scientific doubt as to the absence of effects. If the baseline scientific data is dated or incomplete or in the case of the discharge point, completely wrong then an assessment cannot be carried out and the application refused.

3.21 The applicant excluded Water bodies affected by the development via cumulative impacts and hydrological pathways. They applied an incorrect test of site selection based on proximity to the site. This is not in accordance with the legislation or jurisprudence. Assessment is based on impacts via hydrlogical links. For this particular development hydrological pathway receptors due to sewage overflow discharge points in the proposed agglomeration and surface water runoff from catchments that constructional and operational activity will take place in, include:

3.21.1- IIE_EA_09T010800 TOLKA_030 / IE_EA_09T011000 TOLKA_040 / IE_EA_09T011100 TOLKA_050 / IE_EA_09T011150 TOLKA_060 / IE_EA_090_0200 Tolka Estuary (CSO / SWO overflows and Blanchardstown Tanks overflow in event of WWTP failure.

3.21.2 -IE_EA_09S071100 SLUICE_010 - The construction counpounds/ corridors/ and access routes via Kinsealy Portmarnock are within the surface water Catchment that drains to the Sluice River and so it must be assessed.

3.21.3 -IE_EA_060_0100 Broadmeadow Water (surafce and emergency fire runoff from RSBF discharges to ward River which discharges to Broadmeadow.

3.21.4 -IE_EA_090_0100 North Bull Island / IE_EA_090_0300 Liffey Estuary Lower / IE_EA_090_0400 Liffey Estuary Upper (Tolka outflows)

3.21.5 -IE_EA_020_0000 Northwestern Irish Sea (HA 08) Hydrological link and Malahide shellfish designated waters link it.

3.21.6 -IE_EA_090_0000 Dublin Bay , E_EA_060_0000 Malahide Bay hydrologically linked.

3.21.7 -IE_EA_040_0000 Rockabill – hydrologically linked, linked by Rockabill to Dalkay SAC and North western Irish Sea SPA

3.21.8 -Any Co Kildare or Meath waterbodies that receive discharges from the proposed GDD agglomeration network. The applicant recently updated Drainage Area Plans and submitted an updated list and maps of discharges to the EPA fro the Ringsend (Greater Dublin Area agglomeration) so they have this info to available and it should under legislation be included in this application so that all discharges (not just primary and secondary discharges) can be modelled and cumulatively assessed.

3.21.9 It should be noted that the applicant has yet to assess the migratory path of fish species such as the European eel / salmon etc via Baldoyle estuary and salmonoid rivers. This is despite repeated requests I have made to do so. Inadequate reference was made in EIAR but not in the WFD assessment report. A WFD specifically provides for consideration of fish if the development activity:

- is in an estuary and could affect fish in the estuary

- is outside the estuary but could delay or prevent fish from entering the estuary

- could affect fish migrating through the estuary to freshwater

3.22 Any WFD impact assessment must Include fish if the activity could impact on normal fish behaviour like movement, migration or spawning. For example, if the proposed development construction or operation will lead to:

- a physical barrier like a barrage or weir, or culvert

- noise or vibration (tunnel boring)

- a chemical change like low dissolved oxygen across part or all of the estuary

- a significant change to the depth or flow of the water body

3.23 It should be noted that the Portmarnock Bathing waters was substantially extended in 2023 which the Applicant seems to have taken no regard of in relation to impact on Bathing water Quality. I have attached the Bathing water profile at Appendix 5.9 and the Letter from Fingal County Council confirming the extended designation. This means that the bathing water is now immediately adjacent to teh construction area, dredge area and operational sewage discharge point for the GDD. The previous GDD Bathing water impact assessment used the monitoring point to the extreme North of the bathing water to asses the modelled cfu/100ml impacts under the Bathing Water Directive. However the impacts and monitoring in the event that the GDD is granted will be taken from the closet point of the designated bathing water to the GDD discharge point in the South, as statutorily provided for by the Bathing water regulations. AS such the new modelling with correct data input must ensure that the Impact point assessed is at the closest section of bathing water to the outfall discharge. (see fig 3.6.)

3.24 Section 1.6.3.1.3 states: *Ward_030 Operation During the operation of the proposed RBSF, the only emissions to surface water will be treated and attenuated surface water runoff from roofs and hardstanding areas. Wastewater and any runoff from inside the buildings will be collected and will be pumped off site to a public sewer. Runoff will pass through hydrocarbon interceptors, silt traps / sedimentation and attenuation prior to discharge to Huntstown Stream on the western boundary of the Proposed RBSF site. As stated in Section 1.2.2, Huntstown Stream is not designated under the WFD. However, the stream does discharge to the WFD designated Ward_030 approximately 200m downstream of the proposed outfall locations. The potential impacts to water quality will arise from accidental spillages of chemicals, hydrocarbons or other contaminants entering the drainage system and discharging to the stream. However, the drainage design considerations will ensure that in the event of significant accidental spills, the discharge will be contained by hydrocarbon interceptors. Additionally, there will be some additional dilution capacity via Huntstown Stream prior to reaching the Ward_030 water body. Therefore, no impacts to the WFD water quality elements are anticipated on the Ward_030.*

3.25 This conclusion is unacceptable. Road runoff, biosolids sediments from loading, offloading of truck must be assessed. Hydrocarbon interceptors just deal with hydrocarbons, not tyre dusts (which are toxic), and other pollutants from sewage sludge like microplastics, PFAS that could be washed into water bodies. The previous decision also conditioned an assessment of impacts for from firefighting runoff on the ward, this must happen as part of the WFD assessment before consent. An ad hoc assessment of any intermediate undesignated water bodies or unassigned waterbosies is also required if they are pathway receptors.

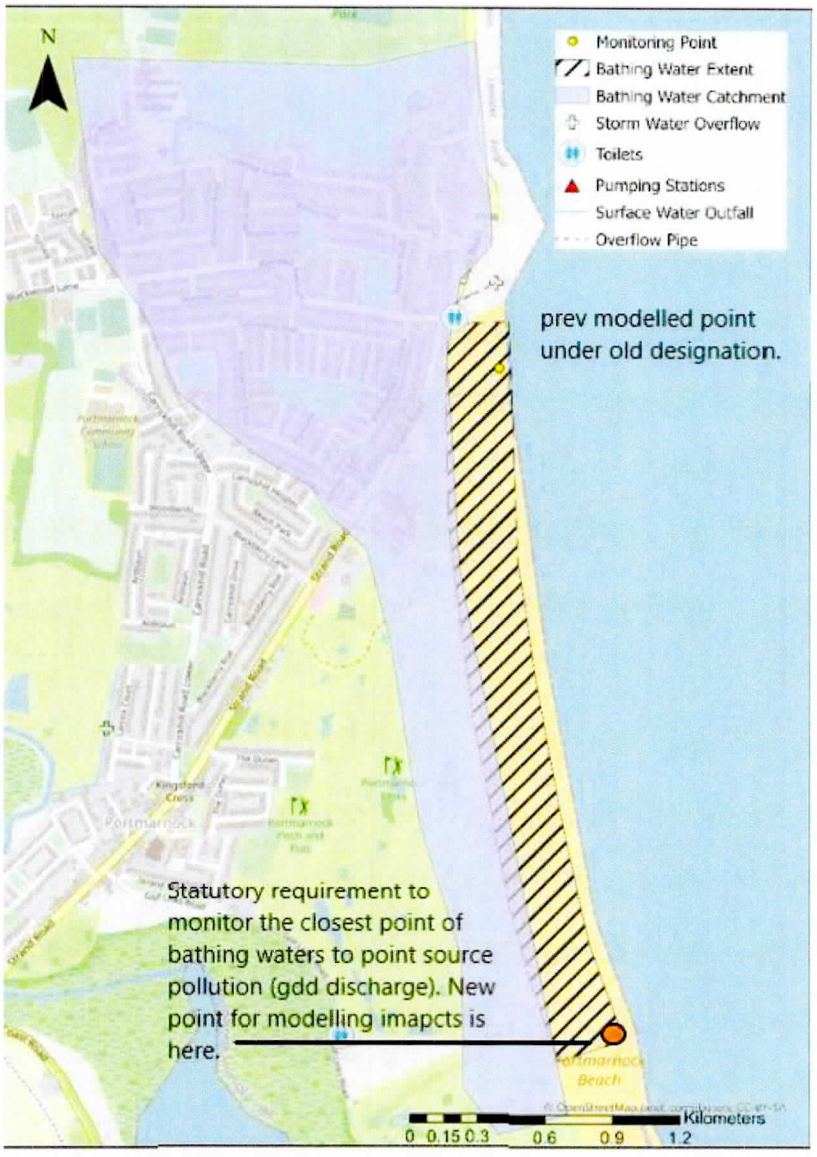


Figure 3.6 new extent of Portmarnock Bathing waters.

4. Shellfish water impacts:

4.1 I included a number of documents received under AIE from Uisce Éireann in relation to internal discussion with their shellfish expert Marja Arbeson. These documents definitively identify via scientific evidence that the discharge from the Greater Dublin drainage project poses a danger to the Class A shellfish waters. There was no engagement with the issues that were raised by these documents in my last sub nor any reason given as to why UE never sought to produce the evidence to The Board to identify that the UV treated effluent at the 20,000 cfu per 100ml would breach the safe levels for this designated shellfish area.

I have attached documents at App. 4.4 which identify pressures on Malahide Shellfish waters and the latest pollution reduction program.

4.2 At the oral hearing Ciaran O'Keefe admitted that their model runs for a discharge of 39,000 cfu were an issue and that the process failure was a disaster, so he made two commitments at the oral hearing. a) that the effluent would be 20,000 cfu (no evidence to back up if this was attainable) and b) that they would put a system in place that meant NO raw sewage would discharge to sea AT ALL in event of a process failure, that it would be stored in the network upstream of the UV treatment building.

4.3 However in the updated EIAR, The applicant has rolled back on that commitment and now have indicated that there will be a discharge to sea in the event of a process failure (EIAR Chapter (A section 9.5). Now I have already shown that the modelling is based on the wrong discharge point which as a result has led to better outcomes of impact that if the correct discharge point had been modelled (as it is in shallower, waters with a circulating current rather then north south current, and more sheltered by Ireland's Eye) So if these internal documents are showing that the incorrectly modelled discharge is breaching safe levels then the actual discharge point will be much worse.

4.4 If in the case of a process failure raw sewage will go to sea the impact assessments for AA and EIA and Combined Approach/ WFD need to be redone to account for this. As it stands with the wrong location that has better dilution the applicant own experts came to the following conclusions.

4.4.1 Marja Arberson in Appendix 4.1 identifies the below table at Figure 4.1 as being the acceptable levels of cfu in the water column before the update of that water will cause an exceedence of the acceptable levels of ecoli in razor clam (all species highlighted in yellow) flesh. To meet class A standards of 80% compliance rate , the level of ecoli in teh water column of the shellfish waters cannot be higher than 20cfu/ 100 ml. Or 1.4 geomean cfu/100 ml.

4.4.2 in Appendix 4.2, Marja Arberson's memo on Literature review- E. Coli , the scientific basis for the uptake rates and levels are explained. In this memo Ms Arberson references a 75% compliance rate rather then the more stringent 80% that is the acceptable level for Class A waters.

4.4.3 In Appendix 4.3 and 4.3B Jacobs' Ciaran O Keeffe sends Dara White and email with the model run outcomes for 20,000 cfu. It is clear from teh document that the level required to maintain Class A shellfish waters for Razor Clam- All species is breached in these scenarios, scientifically proving that the discharge will cause toxic contamination of shellfish which will have impacts on the designation of the site. See Fig 4.2 (Fig 5 of in Appendix 4.3) where the spikes are above the 20 cfu line. The corresponding table for geomean also confirm exceedence.

4.5 In a nutshell if they cannot meet safe levels when they are modelling from the wrong but better discharge location, with outdated and lower riverine flows and ecoli rates, dated WWTP inputs for modelling, without cumulative CSO/SWO discharges in the modelling, then there is no way they the discharge is meeting the standard when modelling is eventually done correctly. Application must be refused.

Table 6 - Indicative water standards required to achieve shellfish flesh standard of 230 *E. coli* MPN/100g

Species	No. samples /annum	Target annual compliance rate (%)	Compliance required in individual samples (%)	Geomean required in flesh (MPN/100g)	Estimated geomean *E. coli* in seawater (cfu/100ml)	Estimated 90%ile *E. coli* in seawater (cfu/100ml)
Mussels	4	95	99	21	1.7	6
	4	90	97	34	2.7	10
	4	80	95	44	3.4	12
	4	75	76	114	8	30
	12	90	95	44	3.4	12
	12	80	87	75	5.5	20
	12	75	76	114	8	30
Pacific oysters	4	95	99	11	1.7	12
	4	90	97	20	2.9	21
	4	80	95	28	3.8	28
	4	75	76	94	11	85
	12	90	95	28	3.8	28
	12	80	87	55	7	52
	12	75	78	86	11	79
Cockles	4	95	99	5.8	0.02	0.2
	4	90	97	12	0.04	0.4
	4	80	95	18	0.06	0.6
	4	75	76	79	0.22	2.2
	12	90	95	18	0.06	0.6
	12	80	87	41	0.12	1.2
	12	75	78	71	0.2	2.0
All species	4	95	99	2.2	0.33	4.8
	4	90	97	5.4	0.57	8
	4	80	95	8.7	0.75	11
	4	75	76	57	2.3	33
	12	95	99	2.2	0.33	4.8
	12	90	95	8.7	0.75	11
	12	80	87	25	1.4	20
	12	75	78	50	2.1	30

Figure 4.1 – update rates for ecoli in shellfish

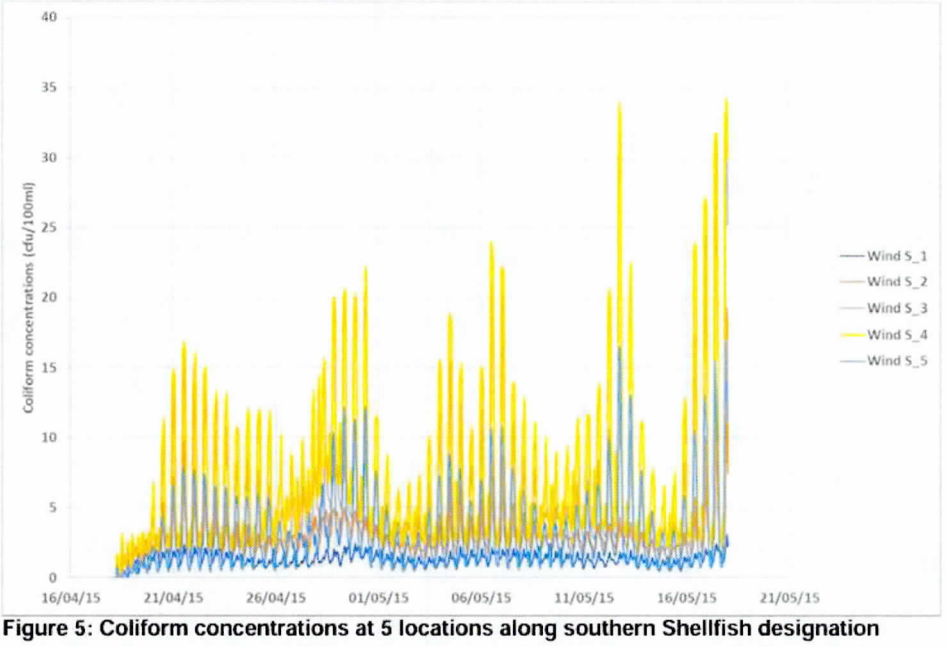


Figure 5: Coliform concentrations at 5 locations along southern Shellfish designation

Figure 4.2 – Exceedence of 20cfu/ 100ml in shellfish waters in modelling 20000 cfu/100ml

5. Cumulative impacts (AA)

5.1 I am unable to make an informed submission on this application due to the incomplete nature of the Natura Impact Statement. This SID application required both AA assessment and EIA assessment therefore both an NIS and EIAR are required. However the applicant does not produce a stand alone NIS that is in compliance with the legislation in the Habitats and Birds Directives. The NIS repeatedly references sections, appendices and conclusions in the EIAR. This is not legally sound. Any conclusions in the EIAR are in accordance with the EIA Directive which has less stringent requirements for assessment than the Habitats and Birds Directives as it is an entirely separate regime. So it is unsafe to use chapters of the EIAR verbatim as appendices for the NIS as they are subject different legal regimes, scoping, and conclusions. While regard is to be had to the provisions of the EIAR directive and impacts identified and assessed, the Habitats and Birds Directives require full compliance (shall comply) and scientific certainty.

5.2 The NIS cannot rely on conclusions in another assessment document. Any conclusions with reference to significant impacts on NATURA2000 sites or Annex species either inhabiting or utilizing the development site(eg. as an ex situ feeding or roosting site) must be reasoned and contained within the NIS itself. One such example is Section 1.1 of the revised NIS document which states:

Purpose of this Document : This document outlines the protocols for surveys and presents the ornithology data collected for the Greater Dublin Drainage (GDD) Project on estuarine, coastal and marine ornithology. It should be read in conjunction with the relevant Environmental Impact Assessment Report (EIAR) chapter (Chapter 10: Marine Ornithology).

The section then goes on to reference survey data, maps etc in the EIAR which are not contained in the NIS document or appendices. A stand alone NIS with complete surveys, mitigation measures, cumulative impacts etc assessed under the AA regime, must be contained in a stand alone NIS.

5.3 In the Revised NIS Section 4.1.6 states:

4.1.6 In-combination Effects Article 6(3) of the Habitats Directive requires that in-combination effects with other plans or projects are also considered. As set out in EC (2019), significance will vary depending on factors such as magnitude of impact, type, extent, duration, intensity, timing, probability, cumulative effects and the vulnerability of the habitats and species concerned.

EC (2020) notes that cumulative environmental effects can be defined as effects on the environment caused by the combined action of past, current and future activities. Although the effects of one development may not be significant, the combined effects of several developments together can be significant.

EC (2020) also notes that the 'in combination' provision applies to plans or projects that are completed, approved but uncompleted, or proposed. In addition to the effects of the plans or projects that are the main subject of the assessment, it may be appropriate to consider the effects of already completed plans and projects. Although already completed plans and projects are themselves excluded from the assessment requirements of Article 6(3), it is still important to

take them into consideration when assessing the effects of the current plan or project in order to determine whether there are any potential cumulative effects arising from the current project in combination with other completed plans and projects. The effects of completed plans and projects would typically form part of the site's baseline conditions at this stage. Plans and projects that have been approved in the past but have not yet been implemented or completed should be included in the in-combination provision. As regards other proposed plans or projects, on grounds of legal certainty it would seem appropriate to restrict the 'in combination' provision to plans that have been proposed, i.e. for which an application for approval or consent has been submitted.

5.4 The applicant has largely failed to adhere to its own methodology in NIS, and has not carried out a correct cumulative impact assessment, both for the EIAR and the AA. The cumulative impacts of the numerous projects and developments along the project route and associated hydrology impacts in the catchment areas overlapping NATURA2000 Network site (and with regards to the requirements of the EIAR), must be assessed robustly. Legal precedent would be case C-392/96 which states;

"The purpose of the EIA Directive cannot be circumvented by the splitting of projects and the failure to take account of the cumulative effect of several projects must not mean in practice that they all escape the obligation to carry out an assessment when, taken together, they are likely to have significant effects on the environment within the meaning of Article 2(1) of the EIA Directive."(C-392/96, Commission v. Ireland, paragraphs, 76, 82; C-142/07, Ecologists en AcciónCODA, paragraph 44 ; C-205/08, Umweltanwalt von Kärnten, paragraph 53; Abraham and Others, paragraph 27; C-275/09, Brussels Hoofdstedelijk Gewest and Others, paragraph 36)

5.5 The problem that is frequently encountered in planning applications is that of carrying out an AA/ EIA on a development and having a finding of no significant effect. Then incorrectly carrying out a cumulative impact assessment by concluding that, because each development in isolation had a finding of no significant effect, then cumulatively there could be no significant effects. This method is manifestly wrong. All effects identified within each development no matter how significant must be assessed in a cumulative matrix. Below at Figures 5.1 and 5.2 I give a visual representation via info-graphic of the correct and incorrect methods of cumulative assessment to be used in AA and EIA assessments.

5.6 Taking the correct methodology into consideration and by providing a robust cumulative effect matrice (to include visual timeline projects pipeline, so sensitive breeding seasons, migration season ect can be visualised) , can the Board can safely conclude that based on correct matrices of cumulative effects between the identified developments in the area of the development and its pathway receptors, could inform proper mitigation measures. These matrices needs to be requested by ABP as part of stand alone NIS and EIAR.

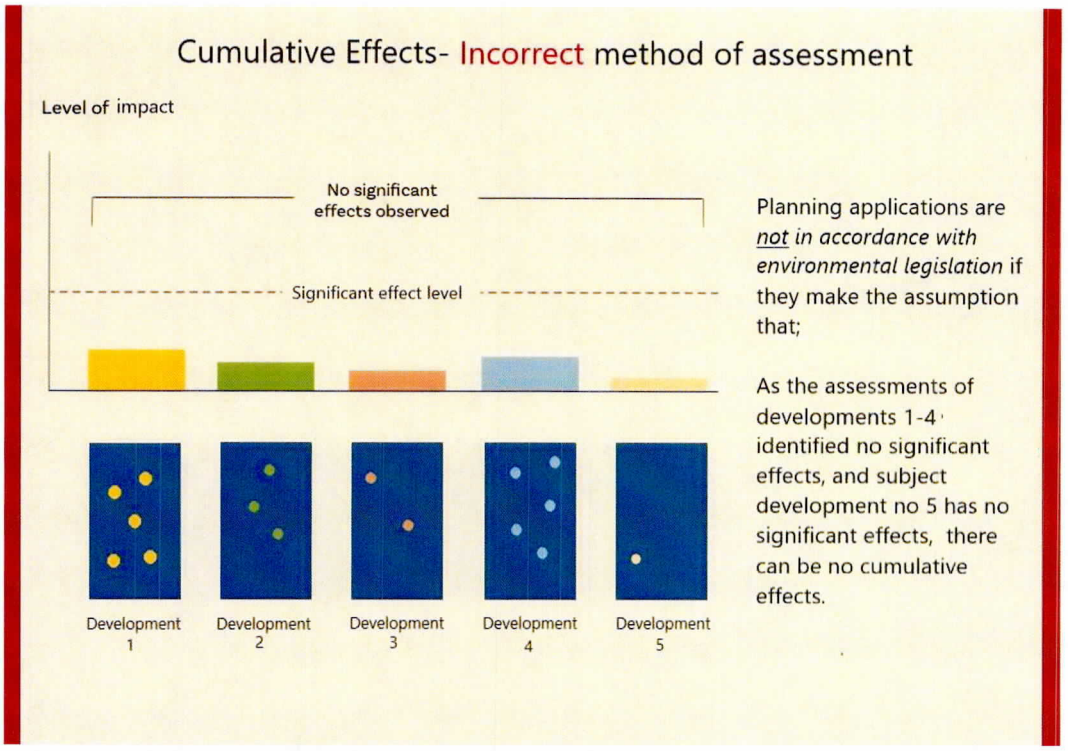


Figure 5.1: Incorrect method of cumulative assessment.

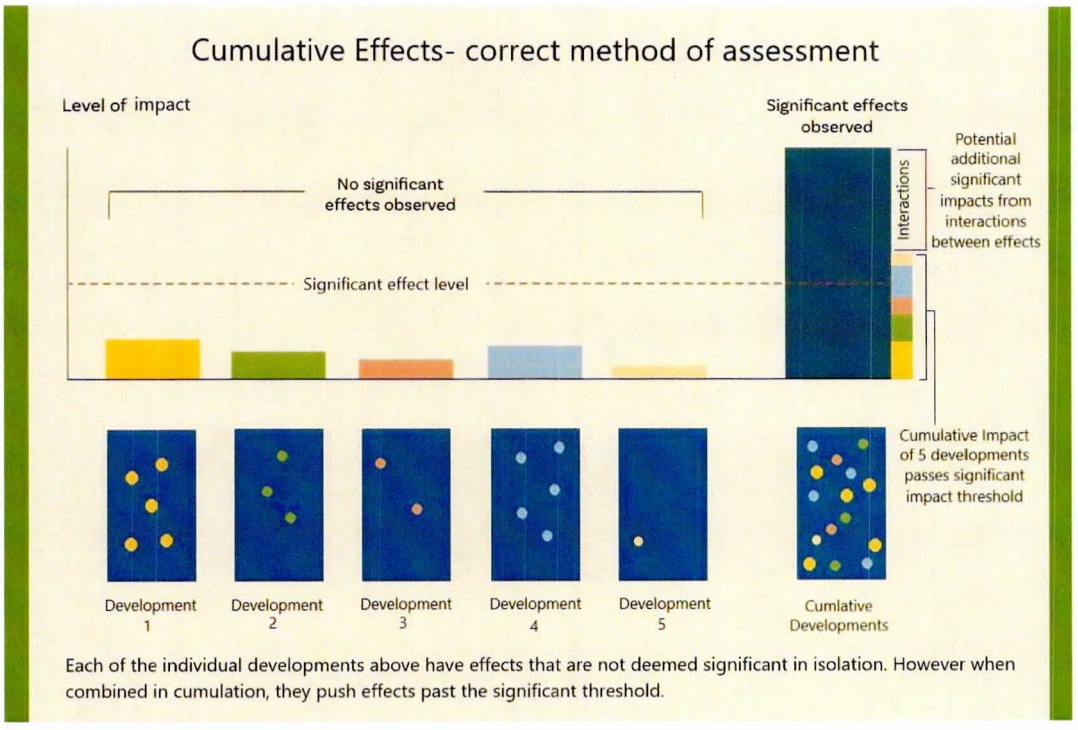


Figure 5.2. Correct method of cumulative assessment

5.7 Dublin airport projects requiring Cumulative Impact Assessment(CIA)

The daa have breached the 32 mppa condition in regarding passenger numbers in 2019 (32.9 mppa) this means that the excess capacity was unauthorised development and no EIA or AA of the 32.9 capacity was ever carried out. Therefore as per required by the Habitats and Birds Directives an EIA and AA of the excess impacts must be completed. As the daa planning application F23A/0781 to extend its passenger cap quoted the 32mmpa figure and had not referenced the excess unauthorised operational development, the application has lacunae in its assessment that unfortunately for UI, they must include in this application assessment.

5.8 The flight paths on commencement of the parent permission for the North Runway were not in accordance with the permission granted. This application deals with land use planning which engages the Public Saftey Zone(PSZ) as the WWTP is situated within the Outer PSZ in Clonshaugh. The PSZ is supposed to mirror the flight paths so as to avoid inappropriate development and population density under the flight paths. Thses PSZ are inseparable from the flight paths that have informed the guidance on the Fingal development plan since 2006. In addition an AA was NEVER carried out on the North or South Runway developments so their impacts were never assessed. As planes must fly through SPAs such as the North Western Irish Sea SPA and Baldoyle estuary and there is a known impact of birdstrikes with inbound and outbound flight for Dublin Airport, this application must consider and fully assess the flights as part of this development. Otherwise all cumulative impacts have not been assessed.

5.9 The originally permitted paths have been breached since Aug 2022 when the permission conditions and permission came into operation. In an attempt to rectify the situation daa tried to bring the as operated flight paths closer to those originally permitted but this does not change the fact that the Airport development has not been in compliance with the plans and application consented in 2006 and 2017. The whole development is unauthorised development due to the use of incorrect flight paths. Remedial EIA and AA impacts must be carried out as part of this application to identify compensation measures for unauthorised impacts of the daa development in cumulation with this one.

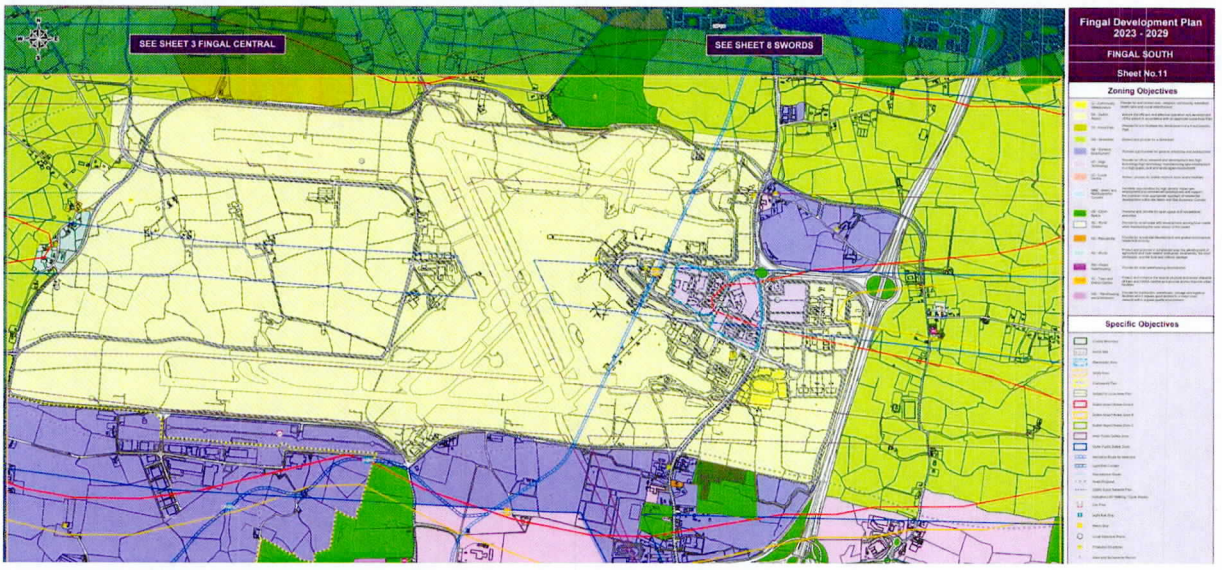


Figure 5.3: Map 8 for swords Fingal development plan inner PSZ in red and outer PSZ in blue.

5.10 The inner and outer public safety zones (PSZ) which stringently inform the land use planning for Fingal and are included on all development plan maps, are based on the originally permitted flight paths. This zone identifies the risk to the public and infrastructure of potential aviation accidents and provides for lower densities and restricted development in these areas in order to minimize mortality and damage rates in the event of an accident. I have attached the PSZ report for Dublin airports and the PSZ maps based on the permitted flight paths in Appendices 5.1 -5.7 of this submission. The report identifies protocols for risk assessments in PSZ.

5.11 The Clonshaugh WWTP section of this site is within the outer PSZ, which has strict land planning objectives to maintain safety. Development that gives rise to safety conflicts are to be restricted in this zone under the precautionary principle. Despite a request to do so in my last submission, the applicant has failed to address the Risk of Major accident impacts that may arise from a Wastewater Treatment and education facility and sludge hub centre that produces and stores BioGas directly under the approach and take off airspace for the South Runway.

5.12 Constructing a biogas storage tank within the Public Safety Zone (PSZ) of Dublin Airport would require careful consideration of several factors, including safety regulations, environmental impacts, and the specific characteristics of the PSZ.

5.12.1 Safety Regulations: The primary purpose of a PSZ is to minimize risks to people and property on the ground in the event of an aircraft accident near the runway. Introducing a biogas storage facility, which inherently involves the storage of combustible gases, could complicate these safety risks. Regulations typically restrict the types of developments and activities that can occur within these zones to reduce risk to aviation operations and nearby populations.

5.12.2 Risk Assessment: Biogas facilities include risks of leakage and explosion, which could have severe consequences in an area where aircraft frequently operate. The assessment would

need to consider the potential for accidents and their impact not only on the airport but also on the wider community and environment.

5.12.3. Regulatory Compliance: Any proposal for a development like a biogas storage tank near an airport would need to comply with national and international aviation safety standards, as well as local planning and environmental regulations. This includes the Irish Aviation Authority's guidelines and any specific restrictions imposed by local government development plans and airport authorities.

5.12.4 Alternatives and Mitigation: If a biogas facility is considered near an airport, alternatives (such as locating it farther away from the PSZ) or mitigation measures (like enhanced safety mechanisms) would likely be necessary to address the heightened risks.

5.13 In conclusion, placing a biogas storage tank within the Public Safety Zone of Dublin Airport would involve significant challenges, risks and material contraventions of the objectives of the Fingal Development Plan 2023-2029, that makes it impermissible development at this site. It would be advisable to consult with aviation authorities, safety experts, and The Council to fully understand the implications of such a project. I again remind the inspector that the Council (and councillors) were never made aware of the biogas recovery and storage element of the development when the SID was presented and discussed at the Council chamber meeting. The council did spot missing documents during this meeting which they requested, but they were never given a change to comments on the Septmber 2018 addendum document nor these addendum documents, which is contrary to the legislation relating to Council consultations and Chief Exec reports on SID applications.

5.14 Below are objectives from Fingal Development Plan that tie the flight paths and land use planning together in a legally binding manner, and restrict inappropriate development that can contain high density of populations groups (schools, education facilities) and safety issues (biogas explosion/ Cyber attack, aircraft hijacking)

Objective DAO14 – Aircraft Movements and Development Restrict development which would give rise to conflicts with aircraft movements on environmental or safety grounds on lands in the vicinity of the Airport and on the main flight paths serving the Airport, and in particular restrict residential development in areas likely to be affected by levels of noise inappropriate to residential use. Objective DAO15 – Ongoing Review of Operation of Noise Zones Review the operation of the Noise Zones on an ongoing basis in line with the most up to date legislative frameworks in the area, the ongoing programme of noise monitoring in the vicinity of the Airport flight paths, and the availability of improved noise forecasts.

Objective DAO18 – Safety Promote appropriate land use patterns in the vicinity of the flight paths serving the Airport, having regard to the precautionary principle, based on existing and anticipated environmental and safety impacts of aircraft movements. Objective DAO19 – Review of Public Safety Zones Support the review of Public Safety Zones associated with Dublin Airport and implement the policies to be determined by the Government in relation to these Public Safety Zones.

5.15 Dublin Airport PFAS Contamination of water bodies and groundwater:

In 2016/2017 when construction the North Runway the daa found PFAS contaminated soil from historical Firefighting Foam and De-icing chemicals used at the Dublin Airport Campus. The contamination had not been identified in the EIS carried out in early 2000's. Instead of ceasing works and identifying the extent of the contamination and carrying out a remedial EIAR/ NIS and associated assessments, the daa reburied the soil in another location on site. When carrying out further works to North Apron contaminated soil was excavated and exported for remediation. Again no EIA / AA assessment was carried out. In essence the works are unauthorised development.

5.16 The difficulty for UE is that the GDD pipeline route that must be excavated is on the boundary of the Dublin Airport campus . Another issue is that the Live applications for a Drainage Area Plans which includes partial treatment of contaminated surface water, state that the contaminated runoff that is partially treated will be discharged to the North Fringe Serwer and so will be make up the influent to be treated by the GDD project.

5.17 The third issue is that a PFAS risk assessment and monitoring report released by the daa [3] in April 2024 has identified high toxic contamination of PFAS in The Mayne, Cuckoo and Sluice Rivers which the Dublin Airport Campus drains into. There is also soil contaminations and groundwater contamination.

5.18 PFAS, or per- and polyfluoroalkyl substances, are a group of man-made chemicals that include PFOA, PFOS, GenX, and many other chemicals. PFAS have been used in industry and consumer products worldwide since the 1940s, Firefighting Foam, Chemicals, Paint items, de-icers, and products that resist grease, water, and oil.

5.19 PFAS are often called "forever chemicals" because they do not break down in the environment and can accumulate over time. The persistence and widespread presence of PFAS pose significant risks to marine life:

5.19.1 **Bioaccumulation and Biomagnification:** PFAS can accumulate in the bodies of marine organisms, from small fish to large marine mammals such as harbour porpoise. The concentration of these chemicals can increase up the food chain, reaching higher levels in predator species, which may include humans who consume seafood.

5.19.2 **Toxicity to Marine Species:** PFAS exposure has been shown to be toxic to marine and freshwater organisms. These substances can affect growth, reproduction, and survival of species such as fish and amphibians. They can cause developmental, behavioural, and physiological changes in marine life.

5.19.3 **Impairment of Reproductive Functions:** PFAS can disrupt the endocrine systems of marine animals, leading to impaired reproductive capabilities. This includes effects on the development of offspring and decreases in population numbers over time. I have already

[3] https://www.dublinairport.com/docs/default-source/sustainability-reports/2021-2023-Environmental-Monitoring-Report.pdf

provided scientific information on the purging of such toxins into the mile of marine mammals which pass on deadly amount to their babies.

5.19.4 **Immunotoxicity:** There is evidence that PFAS compromise the immune systems of marine organisms. This can increase susceptibility to diseases and affect the overall health and resilience of marine populations.

5.19.5 **Contamination of Aquatic Ecosystems:** PFAS can contaminate water bodies through various routes, including industrial discharges, contaminated sewage sludge, and runoff from products containing these chemicals. Once in the water, they are difficult to remove and can persist for long periods, affecting entire aquatic ecosystems. In the case of this development , sewage discharge containing known PFAS contamination from Dublin airport in addition to surface water run noff from the airport into the Sluice and Mayne which feed into Baldoyle Bay SAC/ SPA and on to the Rockabill to Dalkey SAC will bioaccumulate in the receiving waters as PFAS is a forever toxin. It must be noted that leachate tanked in from historical landfills also make up the influent to WWTP.

5.20 The long-lasting effects and resilience of PFAS in marine environments make them a significant concern for environmental health and biodiversity. Addressing PFAS contamination requires multi agency co-operation and multi discipline assessment and stringent regulations to limit their release into the environment. Under the precautionary principle if impacts cannot be mitigated (full removal of PFAS from Wastewater) then the development cannot be granted.

5.21 **Razor Clam Dredging.** There has been absolutely no impact assessment under EIA or AA of the periodic dredging of the razor Clams in the Malahide Shellfish area. The dredging does not just affect the razor clam but all species impacted by severe damaging to the seabed, being physically caught in the dredge, spawning grounds for sandeel etc in addition to the sediment plumes from the event.

5.22 **Howth Harbour redevelopment:** no cumulative modelling of sediments or of impact of a potential change to hydro morphology of the mouth of Baldoyle estuary as a result of the redevelopment

5.23 **Windfarms , associated export canles and fibre optic cables.**

The applicant has only identified one of the many windfarms seeking consent in the Rockabill to Dalkey SAC and has not listed the cumulative impacts on Harbour Porpoise, in relation to lubricant spills (each wind turbine requires approx 80 gallons per year), sea water lift pumps for turbine cooling stations extracting cold sea water and retuning warmer potentially less clean water to the sea. The warmer temperature impact of the GGD effluent have not been assessed at all in relation to the impact warmer waters will have on physical chemical biodiversity and the biomineralisation process of reefs (for which Rockabill to Dalkey is designated. What interaction will warmer freshwater effluent have on pH and salinity?

5.24 Depending on their size, each of the turbines will require a concrete base excavated into the ocean sediment up to 150 feet deep and 30 to 40 feet wide. This will clearly cause a huge amount of mud to be dispersed into the water column. Both these species of whales are of the

baleen type. They are filter-feeders using their baleen to strain their food into their stomachs. The mud from these many excavations may interfere with their feeding and may also affect the species they depend on for food.

5.25 **Huntstown Power station:** EIA exemption notice in iris ofiguil 24/12/22 makes it impossible to do cumulative impact due to EU energy exception, so there are lacunae in EIA/ AA an unexpected consequence of the legislation.

6. NIS/ AA assessment issues:

6.1 **Harbour Porpoise/ Cetaceans;** Wastewater can have several impacts on harbour porpoises, a marine mammal species designated for the Rockabill to Dalkey SAC, who are sensitive to changes in their environment. Here are some of the main effects:

6.1.1 Pollution and Chemical Exposure: Wastewater can carry a variety of pollutants, including heavy metals, pesticides, and pharmaceuticals, which can contaminate the marine environment. These chemicals can accumulate in the tissues of harbour porpoises, potentially leading to poisoning, reproductive issues, and other health problems.

6.1.2 Nutrient Loading: Wastewater often contains high levels of nutrients like nitrogen and phosphorus, which can lead to eutrophication in marine waters. This process can cause algae blooms that reduce oxygen levels in the water, creating dead zones where marine life cannot survive. Harbour porpoises rely on these areas for feeding, and a lack of oxygen can lead to reduced fish stocks, affecting their food supply.

6.1.3 Noise Pollution: Wastewater treatment and discharge processes can contribute to noise pollution, especially if they involve industrial activities or occur in heavily trafficked waterways. Noise pollution can interfere with the echolocation abilities of harbour porpoises, making it difficult for them to navigate, communicate, and find food.

6.1.4 Habitat Disruption: The physical infrastructure associated with wastewater discharge (like pipes and outflows) can disrupt the natural habitats of marine life, including those of harbour porpoises. This can lead to changes in local ecosystems, affecting the availability of prey and the overall health of the marine environment.

6.1.5 Pathogen Spread: Wastewater can also contain bacteria and viruses that can be harmful to marine life. The introduction of these pathogens into the marine environment can lead to diseases in harbour porpoises and other marine species.

6.2 **Freshwater impacts:** Harbor porpoises are primarily marine animals, typically found in coastal and shelf waters. They are not usually associated with freshwater environments like rivers or lakes. However, there are situations where freshwater can influence marine environments and indirectly affect harbour porpoises. Impacts Include:

6.2.1 Salinity Changes: Freshwater inputs from rivers and sewage pipes can significantly alter the salinity levels of coastal waters. Harbour porpoises are adapted to saline conditions, and sudden or significant changes in salinity can affect their physiology and health. Changes in salinity can

also influence the distribution and availability of prey species, which are crucial for the porpoises' diet.

6.2.2 Sedimentation: Freshwater flows can carry sediments that cloud coastal waters, decreasing water quality and affecting the ecosystem health. Increased sedimentation can reduce light penetration and affect the growth of aquatic plants and the small fish and invertebrates that harbour porpoises feed on.

6.2.3 Nutrient Loading: wastewater and freshwater inputs often carry nutrients that can lead to eutrophication in coastal zones. This can cause algae blooms and subsequent oxygen depletion, which can have cascading effects on the marine food web, including the fish populations that harbor porpoises rely on.

6.2.4 Temperature Changes: Freshwater inflows can also alter the temperature of coastal waters. Since water temperature is a critical environmental variable affecting the distribution of many marine species, changes in temperature can shift prey populations and affect the foraging success of harbour porpoises.

6.2.5 Chemical Contamination: Rivers and sewers can transport pollutants from agricultural, landfill leachate and urban runoff into marine environments. These contaminants can accumulate in the marine food chain, potentially affecting the health of harbour porpoises through bioaccumulation of harmful substances like pesticides, heavy metals, and other toxic compounds.

6.3 Another Freshwater impact is Fresh Water Skin Disease (FWSD) in marine mammals, particularly cetaceans like dolphins and whales, is a relatively new area of study but has been increasingly observed among populations that spend extended periods in freshwater environments or estuaries. This disease has been particularly noted in populations such as the killer whales in the Columbia River and dolphins in the northeastern U.S. who enter freshwater areas. Here's a breakdown of the impacts of FWSD:

6.3.1 Skin Lesions: The most apparent impact of FWSD is the development of skin lesions, which can vary in severity. These lesions often appear as white or light gray patches, ulcers, or blisters. They can cover significant portions of the body, potentially leading to secondary infections or systemic health issues if the skin's protective barrier is compromised.

6.3.2 Increased Vulnerability to Infections: The lesions compromise the natural protective barrier provided by the skin, making the animals more susceptible to bacterial, fungal, and viral infections. This can exacerbate the condition and lead to more severe health problems.

6.3.3 Behavioural Changes: Animals suffering from FWSD might exhibit changes in behaviour due to discomfort or pain associated with the lesions. This can include alterations in feeding habits, surface behaviours, and social interactions, which can further affect their health and survival.

6.3.4 Impaired Thermoregulation: The skin plays a crucial role in thermoregulation for marine mammals. Damage to the skin from FWSD can impair this function, potentially leading to difficulties in maintaining body temperature, especially in colder waters.

6.3.5. Potential for Increased Mortality: In severe cases, FWSD can contribute to the mortality of affected individuals. This is particularly true if the disease leads to significant infection or if it affects the animals' ability to feed and maintain their health.

6.3.6 Research into FWSD is still ongoing, with much to learn about its causes, the conditions that exacerbate it, and the best strategies for treatment and prevention. Understanding and mitigating the impacts of FWSD is crucial, especially for populations of cetaceans that are already vulnerable due to other environmental pressures. The more dangerous combination of FWSD and impacts from wastewaters additional pollutants must also be assessed when a sewage outfall is discharging immediately into the most populated section of the Rockabill to Dalkey SAC for Harbour porpoise. The applicant failed to supply a copy of Irish Whale and Dolphins Survey of the Rockabill to Dalkey SAC from 2021 (appendix 6.2) but does refer to it stating that population decline was evident. However as the report shows the population density was consistently high near the site of the discharge pipe (see fig. 6.1)

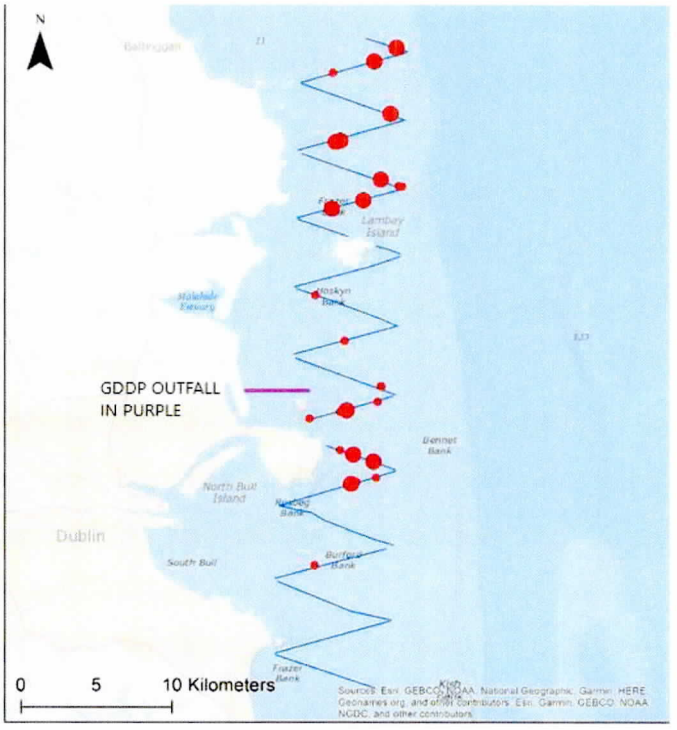


Figure 6.1 – example of 2021 survey effort IWDG

6.4 Wastewater can indirectly contribute to conditions such as pneumonia in cetaceans (whales, dolphins, and porpoises) through several mechanisms, primarily by altering their environment and increasing their exposure to pathogens. The attached Appendix 6.1 Merged Necropsy reports highlights how many cetacean necropsies showed evidence of pnumonia. Here's a detailed explanation of how this occurs:

6.4.1 Introduction of Pathogens: Wastewater often contains a variety of microbial pathogens, including bacteria, viruses, and fungi. When untreated or inadequately treated wastewater is discharged into marine environments, it can introduce these pathogens into the water and sediments where cetaceans live and feed. Cetaceans can be exposed to these pathogens

through ingestion of contaminated water, inhalation of aerosols, or direct contact with contaminated sediments.

6.4.2 Immunosuppression: Exposure to pollutants found in wastewater, such as heavy metals, chemicals, and biotoxins, can compromise the immune systems of marine mammals. A weakened immune system makes cetaceans more susceptible to infections, including those that can lead to pneumonia.

6.4.3. Changes in the Marine Ecosystem: Wastewater discharge can also lead to changes in the marine ecosystem that indirectly affect cetacean health. For example, nutrient loading from wastewater can cause algal blooms that reduce oxygen levels in the water and produce harmful toxins. These environmental stresses can weaken cetacean health, making them more prone to infections.

6.4.4. Respiratory Irritants: Certain chemicals and particulates in wastewater can act as irritants to the respiratory tracts of marine mammals. Chronic exposure to these irritants can cause inflammation and damage to the respiratory system, making it more susceptible to infections like pneumonia.

6.4.5 Pneumonia in cetaceans can be a serious condition, leading to breathing difficulties, behavioural changes, and in severe cases, death. It's important for wastewater treatment practices to effectively remove harmful pathogens and chemicals to reduce these risks to marine life. Additionally, monitoring and regulatory measures need to be enforced to ensure the protection of marine environments and their inhabitants.

6.6 **COVID-19:** Marine mammals, including cetaceans and manatees, are susceptible to the SARS-CoV-2 virus, which causes Covid-19. Studies have shown that marine mammals have a level of susceptibility to SARS-CoV-2 (SEE APPENDIX 6.3). The presence of SARS-CoV-2 has been detected in samples from stranded cetaceans and manatees, indicating infection in these animals. The virus can be transmitted through untreated wastewater discharged into natural water systems, posing a risk to marine mammal populations. The potential for reverse zoonotic transmission of SARS-CoV-2 from humans to marine mammals highlights the need for appropriate action to protect these vulnerable populations. That is why the Rockabill to Dalkey SAC was designated to offer that strict protection under the habitats directive.

6.7 Due to the applicants abject failure to assess impacts other than noise on Harbour Porpoise, I have attempted to give additional information on significant impacts requiring assessment, on top of impacts already Identified in previous subs (microplastics, PCB bioaccumulation). These impacts must be assessed under the Combined Approach. I hope the inspector and the Board now have a clear basis for reasoning that the only correct decision is to refuse this application.

6.8 **NIS Issues.**

The current NIS (that is now not in accordance with the requirements of the Habitats & Birds Directive as its conclusion are based on incorrect sewage effluent modelling/ dredging sediments modelling etc. Indicates significant impacts still exist that cannot be mitigated against, i have made a general list below so that when the NIS is redone based on accurate

impacts these issues can be addressed although my default position is that this project cannot go ahead due to the breach of planning and environmental law by the orbital sewer, WWTP campus and outfall. The revised NIS document contains several contradictory statements across various sections:

6.8.1. Impact of Dredging and Noise on Harbour Porpoises:

◦ Section 6.3.2.3 states that the impact of dredging and construction noise on harbour porpoises is negligible and temporary. However, Section 6.3.2.2 suggests that these activities could cause significant avoidance behaviour and temporary threshold shifts in hearing for the harbour porpoises

6.8.2 Sediment Plumes and Water Quality:

◦ Section 6.3.2.3 mentions that sediment plumes generated by dredging activities will have minimal impact on water quality and marine life. Contradictorily, Section 6.3.2.2 highlights concerns about the potential for significant disruption to foraging behaviours and habitat quality for various marine species due to these plumes.

◦ Sediment plumes from dredging are likely to disrupt foraging behavior of visual hunters like seals and seabirds. While mitigation measures are proposed, the document notes that some behavioural changes in these species are unavoidable during the construction period .

◦ (Section 6.2.4.1)The risk of pollution incidents during construction poses a significant threat to water quality, which can affect multiple habitats. The document admits that while mitigation measures will reduce this risk, they cannot entirely eliminate the potential for adverse effects on water quality .

6.8.3 Mitigation Measures:

◦ Section 6.4 asserts that the mitigation measures proposed will effectively minimize impacts on protected species and habitats. However, in Section 6.5, there is an admission that the effectiveness of these measures is uncertain and that ongoing monitoring is necessary to ensure they work as intended.

6.8.4 Cumulative Impact Assessment:

◦ Section 6.3.2.4 claims that cumulative impacts from the proposed activities, in combination with other ongoing projects, are not significant. Yet, Section 6.3.2.5 acknowledges that cumulative impacts could be significant and warrant a more comprehensive assessment.

6.8.5 Impact on Harbour Porpoises (Section 6.3.2.3)

◦ The document acknowledges that noise from dredging and construction activities, although temporary, could lead to significant avoidance behaviour and temporary threshold shifts in hearing for harbour porpoises, which cannot be completely mitigated .

6.8.6 Impact on Intertidal and Subtidal Reef Communities (Section 6.2.2.3.2)

◦ Increased sedimentation from dredging activities, particularly during peak algal growth periods, could damage algal biotopes. The natural high siltation levels in the area already stress these communities, and additional sedimentation could exacerbate this, despite mitigation efforts .

6.8.7 Impact on Seabirds (Sections 6.4.3.2, 6.4.4.2, and 6.4.5.4)

◦ Disturbance and displacement of seabirds such as guillemots and razorbills due to vessel activity and construction noise are recognized as impacts that cannot be fully mitigated. While these effects are deemed temporary and localized, they are significant during certain sensitive periods like breeding seasons .

6.8.8 These sections indicate that while the Revised-NIS document proposes several mitigation measures, there are specific impacts on protected species and habitats that cannot be entirely mitigated, which means that the development cannot be consented with such uncertainty.

7. New Urban Waste Water Treatment Directive.

The applicant did not take into consideration the new requirements for Tertiary and Quaternary Treatment for UWWTP as the legislation was only in train. I can confirm that the text was voted on and adopted by the Council in April, (appendix 7.1) and my contact in the parliament has confirmed that the legislative timeline indicates full adoption and enforcement in the 4th quarter of 2024. In order for proper planning at the earliest possible phase in the planning process under EIA directive the requirements for a new plant design and a relook at the site selection process need to take place.

8. Greater Dublin Strategic Drainage Scheme (GDSDS)

8.1 The Greater Dublin Drainage Project was based on the conclusions and outcomes of the GDSDS. The GDSDS was subject to an SEA the outcome of which necessitated an amendment to the scheme. I do not know what this amendment was as the SEA and amended scheme is not currently available to me. However Scott Cawley when carrying out the Screening and AA on the Fingal Development Plan 2023-2029 stated the following:

"The historical study, which ***was not subject to AA,*** *was a strategic analysis of the water and wastewater infrastructural capacity in the Greater Dublin Area (GDA) across 50 catchments. It identified shortcomings in infrastructure and recommended actions.* ***All subsequent projects that have been proposed following on from the recommendations of the GDSDS have the potential to result impacts such as: habitat loss / fragmentation, species loss, disturbance and displacement and changes to key indicators of conservation status****, although through their development, they can positively benefit the environment and protective measures are included in Plan. Any such projects must comply with the statutory planning requirements and are enshrined as policy requirements within the Plan. No potential for in combination impacts between the Study and the Plan are predicted"* ***(Bold emphasis added).***

8.2 In addition to not being subject to an AA the data that the GDSDS was based on / feed into the modelling it was based on, is now completely out of date and the reliance on this scheme and its conclusions which are still an objective of the Fingal Dev Plan is cannot be considered legally sound. The report was in 2005 and reviewed in 2009 there were also substantial estimated inputs due to lack of monitoring / real data. As such when calculating the Capacity for Ringsend the figures were way off and the Dublin city council ended up commissioning the Fehily Report (Appendix 8.1) which found in 2008 that the GDSDS figures were overly optimistic (section 6.2 of the report). The report identifies the importance of accurate inputs when calculating capacity and criticised the methodology used for Ringsend I believe is mirrored in the methodology for calculating capacity for the GDD Project.

8.3 In 2007 a report was commission ed by the advocy group FairShare to review the conclusions of the GDSDS. The report carried out by UK Engineering firm (Appendix 8.2) found that the the main issue with the GDSDS was that it failed to adequately deal with the aspect of infiltration by rain and stormwater into the agglomerations sewer network. I believe that most of the points in the section 10 summary of the report still stand and are still valid in relation to infiltration. UE have not, in this application or its ASA process considered the alternative of diverting storm water from teh sewer network to reduce shcok loads and give Ringsend more capacity.

8.2 UE now have more data with updated Drainage Area Plans (DAPs) and have network rehabilitation schemes in place. Perhaps the recommendations of the Fairshare report with the enforcement of the polluter pay principal (eg. Intel whose industrial load will be 1/3 of the capacity of the GDD, should treat and reuse their water as they do in other FABs internationally.) Meath could also build there own plant in their own county using additional natures based solution such as constructed wetlands to treat the wastewater where it is produced..

9. Material Contraventions of Fingal/ Meath/ Kildare/ Dublin Development Plans.

9.1 This project contravenes a number of objectives predominately of the Fingal Development Plan (Greenbelt and open space zoning fro WWTP and Waste Recovery Facility, Public Safety Zone Objectives (Finagal and Meath), new 48 metres riparian requirements, removal of objectives and policy for GDD WWTP at Clonshaugh location, new protections for underwater Heritage (shipwreck buried on the outfalll route) to name but a few. The Board will need to be detailed in any decision to Materially contravene the development plans. UE also failed to address any updates in development plans neighbouring Fingal.

10. Irish Rail and Section of Railway line at Maynetown.

10.1 When taking part in the planning process on Portmarnock South Phase 1D SHD development I came across a detailed submission from Irish Rail **(appendix 10.1)** in relation to carrying out works in Maynetown by the railway line. The GDDP requires tunnelling beneath the line and construction traffic and corridors adjacent to it. I have not seen any meaningful consultation with Irish Rail on file but the issues that need to be addressed as per the site specific

requirements of appendix 10 should be considered by the Board and addressed if implementable by UE.

10.2 It should be notes that due to the height and dip in the road the Moyne Road railway bridge may not be able to accommodate heavy vehicles which may necessitate construction traffic using another route to work between sites. This should be addressed in an Updated Road safey Audit (current is from 2014). I note that in the traffic asssments there is mentions of a roundabout the Portmarnock where there are now traffic lights and a cycle path and at another junction in Portmarnock village by Lidl traffic lights where there are none. A new traffic assessment that takes into consideration major changes in the affected network , needs to be addressed.

Conclusion

The foundational data and surveys that underpin this application are outdated and no longer legally sound. If the foundation of the application is gone then the whole application topples. I ask that the Board refuse this application, comply with rather than have regard to all planning and environmental legislation, and give detailed reasons and consideration for same. It is the wrong development in the wrong place and evenif a new application with updated surveys and modelling is made, i cannot see any way in which it could not have a significant impact on the NATURA2000 and WFD water bodies impacted by the development.

Yours Sincerely

Sabrina Joyce-Kemper

Appendices

1.1 SJK route selection submission re EIA scoping 2013
1.2 SJK submission 1 to ABP August 2018
1.3 SJK submission 2 to ABP October 2018
1.4 SJK oral hearing brief of evidence March 2019
1.5 SJK post remittal submission 3 to ABP August 2022.
1.6 CIEEM Advice Note on Lifespan of Ecological Surveys

2.1 EU Commission Communication on the Precautionary Principle.

3.1 Marcon 2011 modelling report
3.2 DHI water quality report for Ringsend EIAR

4.1 Email Marja Aberson 80% table
4.2 Marja Aberson memo on ecoli uptake rates
4.3 COK email to Dara White re 20,000cfu model run
4.3b 20,000cfu model run document
4.4 Malahide Shellfish Area chart SHEET + PRP

5.1 ERM PSZ report detailed
5.2 ERM report Summary
5.3 PSZ Report Annex A
5.4 PSZ Report Annex B
5.5 PSZ Report Annex C
5.6 PSZ Report Annex D
5.7 PSZ report Maps

6.1 Merged Necropsy Report
6.2 IWDG 2021 Survey Rockabill to Dalkey SAC
6.3 Scientific OH report Covid impacts cetaceans and shellfish

7.1 Adopted text of Recast UWWTD

8.2 Fehily report on Ringsend
8.2 Pick Everard Fairshare Review of GDSDS

10.1 Irish Rail submission on Maynetown railway line

Greater Dublin Drainage Project

SID Application

ABP Case file 312131

Appendix Reference:

10.1

Appendix Description:

Sabrina Joyce-Kemper submission 7th June 2024

1-1

Submission to Grater Dublin Drainage in relation to WWTF planned for Clonshaugh with outfall pipe off Portmarnock Strand.

Submitted by: Sabrina Joyce-Kemper

Address: 23 Portmarnock Crescent, Portmarnock, Co. Dublin

Date: 02/08/2013 (submitted via email and hard copy to FCC Head Office in County Hall, Swords.

I am wholly opposed to the project and believe that a number of smaller facility would be more sustainable and efficient. Below please find a list of concerns in relation to the proposed waste water treatment facility in Clonshaugh with outfall pipe off Portmarnock Strand. I have broken the concerns down into two groups:

1. Public health
2. Environment

1.Public Health

1.a. First and foremost of my concerns lies in protecting the health of the public. The sheer size and flow capacity of the proposed plant, combined with its minimum treatment of waste water, is guaranteed to have a severe impact on public health.

1.b. Dublin Greater Drainage (hereafter referred to as DGD) has stated that the WWTF will serve a final capacity in 2040 of 700,000.00 PE per day. However, they also state that 4400 tonnes of BOD will be treated per day. These figures do not add up. According to the calculations used by the EPA (Environmental Protection Agency) 60g of BOD = 1PE and 1PE is = 200 litres of effluent flow, this means that 4400 tonne of BOD is = 733,333.00PE or 146 million litres to be processed and discharged daily. The 146 Million litres of effluent will only be secondary treated. For a plant that has a design horizon of 2040, implementing only secondary treatment of effluent in the design of the plant is extremely short-sighted, given that EU water quality regulations are becoming stricter each year. In Other EU states Waste water is treated at least to tertiary standard but usually more. Why does DGD insist on implementing outdated methods of waste water treatment.

1.c. Faecal Matter: The proposed treatment plant does not eradicate all Coli and will not remove Human pathogens/ Viruses found in faecal matter. According to a report by the New Zealand government;

Results from international studies now available point overwhelmingly to an association between illness risk to recreational water users and the concentration of suitable faecal indicators (as reviewed by Prüss 1998). They show that careful studies are needed to reveal the relationship, particularly because many of the illnesses concerned are mild and no records are kept of their occurrence (i.e. they are not 'notifiable'). [More severe illnesses (e.g. typhoid) do occur among swimmers at grossly polluted beaches (e.g. in Egypt, El-Sharkawi & Hassan 1979; Cabelli 1983a).] Furthermore, these illnesses include both gastrointestinal and respiratory categories (when sought, respiratory illness effects have often been found; e.g. Fattal et al 1986; Corbett et al 1993; Fleisher, Kay, Salmon et al 1996; McBride, Salmond et al 1998). [Ear, nose, throat and skin symptoms are also found, often being attributed to bather-to-bather transmission, rather than to micro-organisms of faecal origin.]

1.d. Testing water for just faecal coliforms (as current sampling procedures do) does not take into account pathogens and viruses, so there is no way to quantify the threat of outbreak in public bathers who will most certainly be exposed to said pathogens. The sheer number of locations that sewage will be diverted from (4 counties), makes it impossible to track the source of an outbreak, while at the same time promoting the spread of pathogens/ viruses over a wider area, instead of a localised area as would be the case with smaller plants treating local waste. This issue cannot be ignored during the drawing up of the EIS. Just because current sampling methods cannot identify pathogens/ viruses present in the water does not mean that this very real health treat should be ignored, some form of testing and eradication for pathogens/ viruses need to be put in place and should be addressed in the EIS. A seperate report needs to be drawn up on sludge that is dried for agricultural use and this sludge may also carry pathogens and viruses.

1.e. In the event of heavy rain flow such as has been experienced in the past number of years in Ireland, raw sewage would be pumped into the waters off Portmarnock, Howth and Malahide, seriously contaminating the waters. Waters which, according to tidal charts, move up and down the coast in the ebb and flow bringing waste in towards Portmarnock Strand and then out towards Howth. A detailed field study of the tides (NOT a desktop exercise) must be carried out as part of the EIS.

1.f. Hard Metals/ Chemical Agents/ Toxins:According to the consultants load assessment report on the GDG website, an approximation of 16% of waste water will have come from heavy industry or commercial facilities. This, in addition to everyday domestic chemicals which enter the sewage chain, will result in an accumulation of hard metals/ chemical agents and toxins in water that cannot be treated by a secondary treatment system. All of the above can cause various serious external and internal illnesses to bathers exposed to high concentrations. In the past, County Councils have taken up to 30 hours to realise that raw sewage had been pumped from a facility due to heavy rainfall or a facility breakdown. This means, there would be no warning to daily bathers, kayakers, and other recreational clubs, who use the amenities along this coastal section. If any of these contaminates were to reach the food chain, further outbreaks of illness may occur in the general public indirectly.

1.g. Another factor to take into consideration is the freshwater to salt water dilution. 146 million litres a day is a huge amount for the sea in this particular area, to just assimilate. (I would like to see as part of the EIS, a visual comparison chart drawn up which illustrates the daily volumes of effluent discharged on a map in comparison to the strand).Freshwater floats in seawater as will the suspended solids, waves then carry in the effluent to shore. Past public health disasters such as chemical and oil spills always show the substances reaching shore. This is bound to happen with effluent too. In winter, waves crash to shore and can encroach on public roads and spaces during high tides, and if carrying raw sewage or effluent could leave residue that would be harmful to human health. I recommend that as part of the EIS a report on Marine inundation levels with respect to the costal shorelines from Asgard Beach, Howth, to Malahide Estuary mouth, be drawn up.

2. Environment: The location of the outfall pipe 6 km from the shore at Baldoyle Estuary is the worst example of complete lack of planning that I have ever encountered in my lifetime. In the immediate location is the most concentrated area of conservation sites and protected natural sites on the whole east cost, namely;

Site Name: Baldoyle Bay SAC (000199)

Site Name: Howth Head SAC (000202)

Site Name: Lambay Island SAC (000204)

Site Name: Malahide Estuary SAC (000205)

Site Name: North Dublin Bay SAC (000206)

Site Name: Rogerstown Estuary SAC (000208)

Site Name: Ireland's Eye SAC (002193)

Site Name: Rockabill to Dalkey Island (003000)

Site Name: North Bull Island SPA (004006)

Site Name: Rockabill SPA (004014)

Site Name: Rogerstown Estuary SPA (004015)

Site Name: Baldoyle Bay SPA (004016) (also RAMSAR)

Site Name: Malahide Estuary SPA (004025)

Site Name: Lambay Island SPA (004069)

Site Name: Howth Head Coast SPA (004113)

Site Name: Ireland's Eye SPA (004117)

Site Name: Skerries Islands SPA (004122)

These sites are homes to protected species of plants, animals, fish and shellfish. It is an ecosystem on a knife edge. The slightest change to water quality will instigate a ripple effect, which will work its way from the tiniest micro-organism on the food chain such as plankton, a major food source for birds, crustations and fish, to Howth's seals who can be seen in and around Ireland's Eye near the outfall point.

2.a. In the immediate vicinity there are concerns for Puffins whose numbers are dwindling fiercely on Irelands Eye. Also on the highly endangered list is the European Eel. Fish, birds, mammals and shellfish health will also be affected by effluent contaminates, as already listed in section 1, in the same manner as the general public, the main threat posed by the proposed WWTF to the environment is eutrophication.

2.b. According to The Department of Communications, Energy and Natural Resources;

Water quality in Ireland is generally good and compares very favourably with other Member States. The main challenge for water quality is to deal with eutrophication arising from excess inputs of phosphorous from all sources. The extent of eutrophication in the river system has been increasing persistently since the 1970s and has been identified by the EPA as probably the most serious environmental pollution problem in Ireland. –

The same can be said for estuaries I'm sure.

2.c. Eutrophication In the Irish sea has been monitored by the UK Marine SAC who explain the issue here;

Eutrophication is the build up of inorganic plant nutrients in the water body. The effects, in extreme circumstances, can result in reduced water clarity, lowered dissolved oxygen levels, and toxic water quality. The causes, effects and monitoring of eutrophication are considered in turn. The nutrients of primary concern are nitrates and phosphates, and these enter the seawater by a variety of routes: outflow in rivers, direct discharges of sewage and industrial effluents, and atmospheric input all contribute. The concentrations of these nutrients have increased substantially in many British coastal areas in recent years, and are a matter of increasing concern. Thus in the Irish Sea nutrient levels have roughly doubled over the past forty years (Allen et al., in press), and some of the symptoms of eutrophication described below are becoming increasingly evident (Shammon et al., 1997).

The primary effect of eutrophication is to stimulate algal growth, both benthic macroalgae and the microscopic phytoplankton. The adverse effects of excess macroalgal growth are largely aesthetic, caused when increased amounts are cast up on the strandline, or when dense algal growth carpets intertidal areas. However, the effects of phytoplankton proliferation are more serious. Phytoplankton blooms fall into two categories. 'Nuisance' algae (e.g. Noctiluca, Phaeocystis) can create problems by discolouring the water, creating aesthetic nuisance, and more severely by de-oxygenating the water and killing fish and benthic organisms. 'Toxic' algae such asDinophysis can be taken up by shellfish which if eaten may produce diarrhoetic shellfish poisoning (DSP), whilst Pseudonitzchia can induce amnesic shellfish poisoning (ASP). Both of the above genera were recorded in the Irish Sea in 1997 (Shammon et al., 1997), and there are established guideline levels and monitoring procedures (Anderson, 1996).

2.d. As the proposed secondary treatment will not remove nutrients and phosphates there is a very real danger of Eutrophication in the areas of the WWTF outfall pipe which will again catastrophically affect the delicate ecosystem. The sheer volume of effluent being pumped into an area already designated as sensitive is bound to be a problem. Again, a comprehensive and accurate risk assessment must be carried out as part of the EIS to ascertain if the volumes of nutrients and phosphates will decimate the balance of the current eco system, both in the sea and in wetland estuarine areas. There are too many protected species at risk. Each protected species should have an individual impact risk assessment report drawn up in relation to potential threats to their health, ecosystem and food chain. The same should be drawn up for protected plant species.

2.e. Deposits of suspended solids which reach the seabed floor surrounding the outfall pipe and build up sediment at this point must also be addressed. What will the health/ environmental risks to the immediate area be?

2.f. With reference to the outfall pipe which I believe is 2 metres in diameter; An engineering report on how the placement of the outfall pipe will affect the topography of its immediate area on the seabed should be drawn up as part of the EIS. Again, this should be based on field information, not a desk exercise. Although on a larger scale, the building of the bull wall created Bull Island and a mudflat area via sediment build up/ deposits to the north of the wall. The possibility of something similar occurring and altering the current topography of the seabed along the length of the outfall pipe needs to be explored.

2.g. Disturbance (Noise pollution and vibration) of the ground under which the outfall pipe will be drilled must be investigated particularly in areas were protected species live. Most significantly birds, where the disturbance will effect breeding/ nesting/ feeding, stress levels etc, this must be addressed in a separate report.

2.h. The EIS MUST refer to and ensure compliance with the following regulations at international/ national / regional and local level as per FCC local area plans.

EU Level

SEA Directive (2001/42/EC)

Under the SEA Directive the plan requires an SEA. The plan must take into account protection of the environment and the integration of the plan into the sustainable planning of the country as a whole.

Kyoto Protocol Objectives seek to alleviate the impacts of climate change and reduce global emissions of Green House Gases (GHGs). The development plan has regard to the objectives and targets of Kyoto and aim to reduce GHG emissions from the management of residential and commercial development. Harnessing energy from natural

resources could be considered to reduce overall GHG emissions.

Energy End-Use Efficiency and Energy

Services Directive (2006/32/EC)

Aims to make the end use of energy more economic and efficient.

The European Landscape Convention

(Florence 2000)

Aims to promote landscape protection, management and planning and to organise European co-operation on landscape issues.

EU Directive 96/62/EC (Air Quality

Directive)

Objective to improve air quality by controlling the level of certain pollutants and monitoring their concentrations.

EU Water Framework Directive

(2000/60/EC)

Aimed at improving the water environment, requiring member governments to take a holistic approach to managing their waters. Member states must aim to achieve good status in all waters by 2015 and must ensure that status does not deteriorate in any waters.

European Environment and Health Action

Plan 2004 – 2010

Designed to give the EU the scientifically grounded information needed to help member states reduce the adverse health impacts of certain environmental factors and to endorse better cooperation between actors in the environment, health and research fields.

EU Groundwater Directive 2006/118/EC

Developed in response to Article 17 of the Water Framework Directive.

EU Floods Directive 2007/60/ Aim is to reduce and manage the risk that floods pose to human health, the environment, cultural heritage and economic activity

EU Directive 2002/49/EC To define a common approach intended to avoid, prevent or reduce, on a prioritised

basis, the harmful effects, including annoyance, due to exposure to environmental noise.

Environmental Liability

Directive2004/35/CE

Establishes a framework for environmental liability based on the "polluter pays" principle with a view to preventing and remedying environmental damage.

Directive 2009/147/EC of the European

Parliament and of The Council on the

Conservation of Wild Birds

Amended EU Birds Directive 79/409/EEC; related to the conservation of all species of naturally occurring birds in the wild state in the European territory of the Member States. It covers the protection, management and control of these species and lays down rules for their exploitation; it applies to birds, their eggs, nests and habitats. Sites designated as Special Protection Areas (SPAs).

Convention of Biological Diversity

3 main objectives: (I) The conservation of biological diversity, (ii) the sustainable use of the components of biological diversity, and (iii) the fair and equitable sharing of the benefits arising out of the utilisation of genetic resources.

EU Drinking Water Directive 98/83/EC Objective to protect the health of consumers in the EU and to make sure the water is wholesome and clean.

EU Urban Waste Water Treatment

Directive (91/271/EEC)

Aimed at protecting the environment from the adverse effects of urban wastewater discharges and discharges from certain industrial sectors.

Soil Framework Directive (proposed) Member states to adopt a systematic approach to identifying and combating soil degradation.

EU Drinking Water Directive 98/83/EC To protect the health of the consumers in the European Union and to make sure the water is wholesome and clean

Bathing Water Directive 2006/7/EC Repeals Bathing Water Directive 76/160/EEC

on 31st December 2014.

91/271/EEC as amended by Directive 98/15/EEC Urban Wastewater Treatment To protect the environment from the adverse effects of discharges of urban wastewater by the provision of wastewater collecting systems and treatment plants for urban centre.

European Commission White Paper on Adapting to climate change: Towards a European Framework for Action (COM (2009) 147)

Sets out a framework to reduce the EU's vulnerability to the impact of climate change.

European Environmental Agency "10 Message" Publications

A Series of publications released by the European Environment Agency (EEA) which provide a short assessment of European Biodiversity and associated climate change impacts on a range of ecosystems.

EU Air Quality Directive 2008

Sets binding standards for Air Particles.

Directive on Ambient Air Quality and Cleaner Air for Europe (Directive 2008/50/EC

Provides standards for fine particle PM2.5 pollution in the European Union.

Pesticides Framework Directive(proposed)

To control the storage, use and disposal of pesticides to minimise risk to health and environment from their usage and to include measures which relate to soil management strategies in land use planning.

Plan / Programme

Summary of Key Objectives

European Convention on the Protection of the Archaeological Heritage

The European Convention on the Protection of the Archaeological Heritage was drawn up in Valletta in 1992 and entered into force in 1995. Ireland signed the Convention in 1997.

Replacing an earlier Convention that was agreed in 1969, its scope was extended to address damage to archaeological assets resultant from construction projects.

Granada Convention for the Protection of the Architectural Heritage of Europe

Ratified by Ireland in 1997, the 1985 Convention for the Protection of the Architectural Heritage of Europe is intended

to reinforce and promote policies for the conservation and enhancement of Europe's heritage. Covering monuments, groups of buildings and sites of importance, the Convention requires a national inventory of architectural heritage be developed. Legal protection measures must be established, with a system of formal authorisation being required for works affecting protected sites and structures.

National Level Water Services Act 2007 (As amended)

Focuses on management of water in the pipe as opposed to river water quality etc.

National Climate Change Strategy 2007 – 2012

Sets out measures for Ireland's reduction in emissions

National Development Plan 2007 – 2013

€184 million infrastructural investment plan to build a prosperous country for Ireland's Population.

Actions for Biodiversity 2011-2016 Ireland's National Biodiversity Plan

Objective to promote the conservation and sustainable use of biodiversity.

National Energy Efficiency Action Plan 2009 - 2020

Sets out the government's actions to achieve 20% energy efficiency saving.

Sustainable Residential Development in Urban Areas – Guidelines for Planning Authorities 2009

Objective to produce high quality sustainable development which includes the integration of schools, community facilities, employment, transport and amenities in a timely and cost effective manner.

Urban Design Manual – A Best Practice Approach

Companion document on best practice implementation of Sustainable Residential Development in Urban Areas.

The Planning System and Flood Risk Management – Guidelines for Planning Authorities 2009

Aims to integrate flood risk management into the planning process.

Plan / Programme Summary of Key Objectives Preventing and Recycling Waste: Delivering Change (2002)

Aims to achieve an integrated approach to waste management based on the internationally accepted hierarchy of options with waste prevention favoured.

Framework and Principles for the Protection of the Archaeological Heritage (1999)

Outlines the State's general principles in relation to the management and protection of archaeological heritage.

European Communities (Environmental Assessment of Certain Plans and Programmes) Regulations 2004 S.I. 435 of 2004 (as amended by S.I. No. 200 of 2011) and Planning and Development (Strategic Environmental Assessment) Regulations 2004 S.I. 436 of 2004 (as amended by S.I. No. 201 of 2011)

Transposes EU Directive 2001/42/EC into Irish Law.

European Communities (Birds and Natural Habitats) Regulations 2011 (S.I No. 477 of 2011)

These Regulations consolidate the European Communities (Natural Habitats) Regulations 1997 to 2005 and the European Communities (Birds and Natural Habitats) (Control of Recreational Activities) Regulations 2010, as

well as addressing transposition failures identified in the CJEU judgements.

Architectural Heritage Protection Guidelines for Planning Authorities (2004)

Practical Guide for planning authorities to deal with the provisions of Part IV of the Planning and Development Act.

Wildlife Act 1976

Main Objectives of 1976 Act: To provide for the protection of flora and fauna, to conserve a representative sample of important ecosystems, to provide for the development and protection of game resources and to regulate their exploitation, and to provide the services necessary to accomplish such aims.

Main Objective of the 2000 (Amendment) Act: To give statutory protection to NHAs, geological and geomorphological sites, enhance the conservation of species and habitats, enhance hunting controls, inclusion of most species for protection, regulation of commercial shoot operators, ensure compliance with international agreements, increase fine levels for contravention of Wildlife Acts, strengthen the provisions relating to the cutting of hedgerows, strengthen the protective regime for SACs and to give statutory recognition to the Minister's responsibilities in regard to promoting the conservation of biological diversity.

Plan / Programme Summary of Key Objectives and Wildlife (Amendment) Act 2000

Transposes EU Habitats Directive 92/43/EEC into Irish law.

Flora Protection Order , 1999 S.I, No. 94 of 1999 and The European Communities (Birds and Natural Habitats) Regulations 2011 (SI477 of 2011).

Primary legislation aimed at protecting rare and endangered plant species in Ireland.

European Communities (Drinking Water) (No.2) Regulations 2007 S.I. 278 of 2007

Transposes EU Water Framework Directive (2000/60/EC) and EU Drinking Water Directive 98/83/EC into Irish Law.

European Communities (Water Policy) Regulations 2009 S.I. 272 of 2009

Gives effect to the measures needed to achieve the environmental objectives established for the bodies of surface water by Directive 2006/60/EC.

Environmental Objectives (Surface Waters) Regulations 2009 S.I No. 272 of 2009

Institutes a wide-ranging set of standards for Irish surface waters.

Bathing Water Quality Regulations, 2008 S.I. 79 of 2008

Transposes EU Bathing Water Directive 2006/7/EC into Irish Law.

Waste Water Discharge (Authorisation) Regulations, 2007 (S.I. No. 684 of 2007

Regulations governing the licensing and certification/authorisation process of sewage systems owned, managed and operated by Water Service Authorities.

European Communities Environmental Objectives (Groundwater) Regulations, 2010 (S.I. 9 of 2010)

These regulations establish environmental objectives to be achieved in groundwater bodies, groundwater quality standards and threshold values for the classification of groundwater and the protection of groundwater against pollution and deterioration in groundwater quality.

Urban Wastewater Treatment (Amendment) Regulations 2010 S.I. 48 of 2010)

Gives effect to Directive 2000/60/EC and to Directive 91/271/EEC.

European Communities (Water Policy) Regulations 2003 S.I. 722 of 2003

Transposes the Water Framework Directive into Irish Law.

European Communities Quality of Shellfish Waters (Amendment) Regulation 2009 S.I. 55 of 2009 & Malahide Shellfish Waters Pollution Reduction Programme for Programmes as per SI No. 268 of 2006

To give effect to in the State to Directive 79/923/EEC of 30th October 1979 on the quality required of shellfish waters.

Plan / Programme Summary of Key Objectives European Communities (Assessment and Management of Flood Risk) Regulations 2010 S.I. 122 of 2010

Transposes EU Floods Directive 2007/60/EC into Irish Law.

Environmental Noise Regulations 2006 S.I. 140 of 2006

Transposes EU Directive 2002/49/EC into Irish Law.

Ambient Air Quality and Assessment and Management Regulations, 1999 S.I. 33 of 1999

Transposes EU Directive 96/62/EC (Air Quality Directive) into Irish Law.

National Renewable Energy Action Plan (NREAP)

The National Renewable Energy Action Plan (NREAP) sets out the Government's strategic approach and concrete measures to deliver on Ireland's 16% target under Directive 2009/28/EC.

Regional Level Retail Strategy for the Greater Dublin Area (GDA) 2008 - 2016

Aims to set out a co-ordinated, sustainable approach to the assessment and provision of retail within the Greater Dublin Area.

Greater Dublin Strategic Drainage Study

Identifies the policies, strategies and projects for developing a sustainable drainage system for the Greater Dublin Region; Identifies the need for the North Dublin Wastewater Treatment Plan and the Orbital Sewer, improvements in the drainage capacity and the need to upgrade existing treatment plants to their ultimate capacity.

Dublin Coastal Flooding Protection Project

Aims to address and assess the risk from tidal flooding around the coastline.

Eastern River Basin District Management Plan 2009 – 2015 and Associated Programmes of Measures

Describes the actions that are proposed to ensure the necessary protection of waters in the Eastern River Basin District.

Catchment-Wide Flood Risk Assessments

Requirement of the EU Floods Directive.

Greater Dublin Strategic Drainage Study(GDSDS) 2005

Objective to identify the policies, strategies and projects for developing a sustainable drainage system for the Greater Dublin Area.

Water Supply Project Dublin Region

Study determining a new major water source to meet projected demand in the long term.

Regional Planning Guidelines for the Greater Dublin Area 2010 - 2022

Aims to direct the future growth of the Greater Dublin Area over the medium to long term involving sustainable planning and through the protection of environmentally sensitive or important locations.

Plan / Programme Summary of Key Objectives Waste Management Plan for the Dublin Region 2005 – 2010

Provides a framework for minimising waste, encouraging recycling and ensuring the avoidance of environmental pollution. Policy also includes diversion from landfill in accordance with targets set out in the European Union Landfill Directive.

DTO Strategy 2000 – 2016 A Platform for Change

Integrated, multi-modal transportation strategy for the Greater Dublin Area.

2030 Vision- Greater Dublin Area Draft Transport Strategy 2011-2030

To identify areas of accessibility within the Dublin Region and the most appropriate locations for intensification of development.

County Wide Level Fingal Development Plan 2011-2017

The Development Plan sets out the spatial framework for the county within the context of National and regional plans.

Fingal Heritage Plan 2011-2017

Highlights diversity and variety of Fingal's heritage and its value to the whole community. The Plan sets out a series of

actions to be undertaken over a five year period to the end of 2010. These actions aimed to raise heritage awareness, to provide baseline information and to manage our heritage more effectively.

Fingal Biodiversity Action Plan 2010-2015

The Fingal Biodiversity Action Plan puts forward an ambitious programme of a 100 actions to protect the sites, habitats, plants and animals that can be found in the County.

Fingal Litter Plan 2012-2015

The primary purpose of this Plan is to describe the activities and resources which will be put in place by Fingal County Council for the management of litter over the period 2012 to 2015.

Fingal Sludge Management Plan 2002

Makes proposals for dealing with sludge arising in Fingal from a number of sources including Agriculture, Industry, Water Treatment and Wastewater Treatment.

Dublin Agglomeration Noise Action Plan relating to the Assessment and Management of Environmental Noise 2008 – 2013

For the Dublin Agglomeration distinct noise maps have been produced for all roads, and all railway lines including the Luas (light rail) for all four local authorities in the Agglomeration. These maps cover the long term average periods for night time (Lnight) and 24 hours (Lden).

Greater Dublin Drainage Project

SID Application

ABP Case file 312131

Appendix Reference:

1·2

Appendix Description:

Sabrina Joyce-Kemper submission 7th June 2024

1·2

SID Submission by: Sabrina Joyce-Kemper
23 Portmarnock Crescent
Portmarnock
Co. Dublin.

SID Submission in reference to: Greater Dublin Drainage Project consisting of a new wastewater treatment plant, sludge hub centre, orbital sewer, outfall pipeline and regional biosolids storage facility **Case reference:** PL06F.301908

1. Introduction.

Due to the extremely high volume of technical documents involved in this project and the difficulty in reviewing all technical documents in the allotted consultation time, I have focused my submission on the construction and operation of orbital and outfall pipe which is just one part of the overall project. However, I do wish to request an Oral Hearing on the application due to its significant environmental impacts and the public interest aspect of the plan.

After careful examination of the Natura Impact Statement and the Environmental Impact Assessment Report, It is clear that the project contravenes Article 6 section 1, Article 6 section 2 and Article 6 section 3 of the Habitats Directive.

Both the construction phase of the project and the operational phases of the project will have significant negative impacts on the habitats and species in Baldoyle SAC, Irelands Eye SAC and Rockabill SAC which will result in the certain deterioration of the habitats and disturbance of species contrary to the conservation objectives for these sites and the associated habitats adjacent to them. The Natura impact statement does admit to some impacts but heavily relies on hypothetical mitigation scenarios and measures to negate the significant negative impacts. In this submission I have highlighted areas where negative impacts in the NIS and marine biodiversity document have been underestimated and indirect but relevant impacts that have been omitted completely and have not therefore been considered or mitigated against at all.

There is an abundance of EU Commission case law which clearly identifies the role of the competent authorities of member states (in this case An Bord Pleanala) and their legal responsibility in the the implementation and interpretation of the Habitats Directive. In fact the legislation has been honed over the years to ensure the strictest of protections and member states have been actively taken to court by the commission when the Habitats Directive has not been enforced. This submission will list the legislation that dictates why this project cannot be green-lighted, quote legal precedents which support this opinion and indicate how they are relevant to this project application.

Official EU Complaint Procedure: Pre-emptive Protection: In addition to this consultation submission, I will also be making a submission via the EU Commissions complaint form as I believe this project is a potential breach of Environment law, Bathing waters legislation in addition to making a complaint submission under the separate form for Water Framework Directive.

2. Application of Article 6.2 of Habitats Directive.

Article 6.2- Member States shall take appropriate steps to avoid, in the special areas of conservation, the deterioration of natural habitats and the habitats of species as well as disturbance of the species for which the areas have been designated, in so far as such disturbance could be significant in relation to the objectives of this Directive

Ireland has not had a good track record with properly implementing this legislation and have ended up in court on a number of occasions when the competent authority failed to enact legislation at planning stage forcing action in the courts.

One such case which is relevant in terms of legal precedence is the Owenduff-Nephin Beg Complex SPA case (Case C-117/00, Commission v Ireland, paragraphs 28-30) taken against Ireland in which the Commission took Ireland to Court for failing to take the necessary measures to prevent the blanket bog of the Owenduff-Nephin Beg Complex SPA from being damaged by overgrazing. In considering the Case the Court made reference to the Conservation plan for the SPA completed in 2000 which stated that the site was heavily eroded due to excessive number of sheep. *"According to the Conservation Plan mentioned in*

paragraph 28 of the present judgment, it will be necessary to keep grazing at a sustainable level in order to achieve objectives such as the maintenance and, where possible, the enhancement of the ecological value of both the priority habitat of the Owenduff-Nephin Beg Complex, that is to say blanket bog, and other habitats characteristic of the site and the maintenance and, where possible, increase of populations of birds mentioned in Annex I to the Birds Directive which frequent the site, including in particular the Greenland White-fronted Goose and the Golden Plover, species which provided justification for the classification of the site as an SPA. Overgrazing by sheep is in fact causing severe damage in places and is the greatest single threat to the site." "It follows from the foregoing that Ireland has not adopted the measures needed to prevent deterioration, in the Owenduff-Nephin Beg Complex SPA, of the habitats of the species for which the SPA was designated".

Baldoyle SAC also has an important population of Golden Plover, over 1% of Irelands population has its habitat in Baldoyle SAC. In addition to Golden Plover the Baldoyle Bay SAC is home to notably protected species namely Shelduck, Bar Tailed Goodwit, Ringed Plover, Grey Plover and Light Bellied Brent geese. The conservation objectives for Baldoyle SAC in relation to all of these species is:

Objective 1:
To maintain the favourable conservation condition of the waterbird Special Conservation Interest species listed for Baldoyle Bay SPA, which is defined by the following list of attributes and targets:

Attribute:	Population trend.
Target:	The long term population trend should be stable or increasing

Attribute:	Distribution
Target:	There should be no significant decrease in the range, timing or intensity of use of areas by the waterbird species of Special Conservation Interest other than that occurring from natural patterns of variation.

Objective 2:
To maintain the favourable conservation condition of the wetland habitat at Baldoyle Bay SPA as a resource for the regularly-occurring migratory waterbirds that utilise it. This is defined by the following attributes and targets:

Attribute:	Wetland habitat
Target:	The permanent area occupied by the wetland habitat should be stable and not significantly less than the area of 263 ha, other than that occurring from natural patterns of variation.

3. Habitat directive 6.3 and the importance of reasonable doubt.

Article 6.3 of the Habitats directive states: "Any plan or project not directly connected with or necessary to the management of the site but likely to have a significant effect thereon, either individually or in combination with other plans or projects, shall be subject to appropriate assessment of its implications for the site in view of the site's conservation objectives. In the light of the conclusions of the assessment of the implications for the site and subject to the provisions of paragraph 4, the competent national authorities shall agree to the plan or project only after having ascertained that it will not adversely affect the integrity of the site concerned and, if appropriate, after having obtained the opinion of the general public. "

This project is a significant infrastructural project one of the biggest any state body/ semi state body has undertaken in a number of years. The one thing that all Natura Impact statements share is that they all tend to come to the conclusion that there are probabbly no significant adverse impacts to any SAC if all encompassing mitigation measures are put in place. This leaves the competent authority in the position of having to read through the lines and try to evaluate if hypothetical mitigation can stave off actual negative impacts. Luckily Article 6.3 above advises obtaining the opinion of the general public who with local knowledge, can help highlight and broaden the potential negative impacts on a Protected Habitat and its species.

There have been a number of high profile cases which have tested the Habitats Directive legislation and their judgments give clear direction to competent authorities regarding the very stringent implementation of article 6.3. Some of the most important judgments are explained or quoted below.

i. According to settled case-law, the appropriate assessment of the implications for the site that must be carried out pursuant to Article 6(3) implies that all the aspects of the plan or project which can, either individually or in combination with other plans or projects, affect those objectives must be identified in the light of the best scientific knowledge in the field (see, to that effect, judgments in *Commission* v *France*, C-241/08, EU:C:2010:114, paragraph 69; *Commission* v *Spain*, C-404/09, EU:C:2011:768, paragraph 99, and *Nomarchiaki Aftodioikisi Aitoloakarnanias and Others*, C-43/10, EU:C:2012:560, paragraphs 112 and 113).

ii. The assessment carried out under Article 6(3) of the Habitats Directive may not have lacunae and must contain complete, precise and definitive findings and conclusions capable of removing all reasonable scientific doubt as to the effects of the works proposed on the protected site concerned (judgment in *Briel and Others*, C-521/12, EU:C:2014:330, point 27).

iii. In Peter Sweetman, Ireland, Attorney General, Minister for the Environment, Heritage and Local Government v An Bord Pleanála C-258/11, the correct application of the aforementioned provisions was summarised by the Court: "40. Authorisation for a plan or project, as referred to in Article 6(3) of the Habitats Directive, may therefore be given only on condition that the competent authorities - once all aspects of the plan or project have been identified which can, by themselves or in combination with other plans or projects, affect the conservation objectives of the site concerned, and in the light of the best scientific knowledge in the field - are certain that the plan or project will not have lasting adverse effects on the integrity of that site. That is so where no reasonable scientific doubt remains as to the absence of such effects (see, to this effect, Case C404/09 Commission v Spain, paragraph 99, and Solvay and Others, paragraph 67).

iv. Reliance on future mitigation measures in order to address any potential LSE is improper: a decision is unlawful if any reasonable scientific doubt exists at the time it is made. In Commission v Portugal C-239/04 (at para. 24) the Court (again approving A. G. Kokott's Opinion) stated: "The fact that, after its completion, the project may not have produced such effects is immaterial to that assessment. It is at the time of adoption of the decision authorising implementation of the project that there must be no reasonable scientific doubt remaining as to the absence of adverse effects on the integrity of the site in question (see, to that effect, Case C-209/02 Commission v Austria [2004] ECR I1211, paragraphs 26 and 27, and Waddenvereniging and Vogelbeschermingsvereniging, paragraphs 56 and 59)."

v. The following judgment is extremely relevant in terms of clarifying that the mere risk or potential that a project would contribute to the partial destruction of a priority natural habitat or priority species is enough to disallow authorisation of a project. The judgment is Peter Sweetman, Ireland, Attorney General, Minister for the Environment, Heritage and Local Government v An Bord Pleanála C-258/11, paragraph 43 which states:

"The competent national authorities cannot therefore authorise interventions where there is a risk of lasting harm to the ecological characteristics of sites which host priority natural habitat types. That would particularly be so where there is a risk that an intervention of a particular kind will bring about the disappearance or the partial and irreparable destruction of a priority natural habitat type present on the site concerned (see, as regards the disappearance of priority species, Case C-308/08 *Commission* v *Spain*, paragraph 21, and Case C-404/09 *Commission* v *Spain*, paragraph 163)."

Above it has been ascertained that EU Legislation is quite clear that that the burden of proving that there are no impacts lays with the applicant and that if they and subsequently the competent authority, cannot guarantee that the project will have no effect and there is any shadow of doubt that there may be an impact whatsoever, then the project cannot be approved.

In the spirit of this legal context, in the next section I lay out some sample examples of how this project will without a doubt, directly cause or indirectly contribute to the destruction of the favourable conservation condition of the habitat and also to the significant decrease in the range, timing or intensity of use of areas by the waterbird species of Special Conservation Interest other than that occurring from natural patterns of variation.

4. Disturbance of Priority Species in Baldoyle SAC/ SPA and Irelands Eye SAC/ SPA.

In relation to Disturbance of protected species in Sacs/ SPA there is also a great deal of proven case law. One such judgment states;

> *Protecting sites from passive as well as active man-induced deterioration and disturbance To implement Article 6(2) of the directive fully, it is not sufficient to merely protect designated sites from any operation with potential to cause disturbance without also ensuring that deterioration due to neglect or inactivity is avoided. It may be necessary to adopt both measures intended to avoid external man-caused impairment and disturbance and measures to prevent natural developments (eg natural succession) that may cause the status of species and habitats in SACs to deteriorate. "It is clear that, in implementing Article 6(2) of the Habitats Directive, it may be necessary to adopt both measures intended to avoid external man-caused impairment and disturbance and measures to prevent natural developments that may cause the conservation status of species and habitats in SACs to deteriorate". (Case C-6/04, Commission v UK, paragraphs 34) 3. Ensuring a sufficient protection regime*

There is no management plan for Baldoyle SAC or Irelands eye SAC and so there is no scope on how to manage human impacts or natural impacts. This in itself could be deemed a contravention of article 6.2 of the Habitats Directive, based on the significance of the site and pressure of impacts from the intensive residential developments within 5k radius of the site.

Disturbance of birds can occur for a number of reasons and has wide and significant negative impacts.

Issue can that can be raised as a result of disturbance events are:

• Temporal availability – whether waterbirds have the opportunity to exploit the food resources in a disturbed area at times when the disturbance does not occur;

• Availability of compensatory habitat - whether there is suitable alternative habitat to move to during disturbance events;

• Behavioural changes as a result of a disturbance - e.g. degree of habituation;

• Time available for acclimatisation - whether there is time available for habituation to the disturbance. (there may be a lack of time for waterbirds during the staging period);

• Age - for example when feeding, immature (1st winter birds) may be marginalised by older more dominant flocks so that their access to the optimal prey resources is limited. These individuals may already therefore be under pressure to gain their required daily energy intake before the effects of any disturbance event are taken into account;

• Timing/seasonality - birds may be more vulnerable at certain times e.g. pre- and postmigration, at the end of the winter when food resources are lower;

• Weather - birds are more vulnerable during periods of severe cold weather or strong winds;

• Site fidelity – some species are highly site faithful at site or within-site level and will therefore be affected to a greater degree than species that range more widely;

• Predation and competition – a knock-on effect of disturbance is that waterbirds may move into areas where they are subject to increased competition for prey resources, or increased predation – i.e. the disturbance results in an indirect impact which is an increased predation risk.

Any activity that causes disturbance can lead to the displacement of waterbirds. The significance of the impact that results from even a short-term displacement should not be underestimated. In terms of foraging habitat, displacement from feeding opportunities not only reduces a bird's energy intake but also leads to an increase in energy expenditure as a result of the energetic costs of flying to an alternative foraging area. Displacement also has knock-on ecological effects such as increased competition (within and/or between different species) for a common food source. In areas subject to heavy or on-going disturbance, waterbirds may be disturbed so frequently that their displacement is equivalent to habitat loss. When disturbance

effects reduce species fitness (reduced survival or reproductive success) consequences at population level may result.

The Baldoyle Bat SAC conservation objectives documents contain a number of foraging and roost surveys undertaken in 2012 and they are included in the conservation report for the site.

These surveys which are illustrated in figures 2-9 inclusive, deal with the most protected bird species on the site for which the original SPA was designated. These surveys very clearly show that all the species birds roost and forage predominantly in the same cross section area of Baldoyle SAC that the GDD projects plans to Tunnel under and build the construction compounds either side of. Fig no. shows the location of the construction compounds and the tunnel boring route through the SAC.

Page 12 of the NIS explains the tunnel construction and compounds' operation as follows:

The microtunnelled section will require two proposed temporary construction compounds onshore, in the open field immediately west of the R106 Coast Road (chainage 0,000m) (proposed temporary construction compound no. 9) and in the grassed space (chainage 1,000m) adjacent to the public car park off the Golf Links Road, immediately north of Portmarnock Golf Club (proposed temporary construction compound no. 10). At proposed temporary construction compounds no. 9 and no. 10, the drive/reception shafts will be constructed, tunnelling equipment will be located and the tunnel materials will be stored temporarily. Waste material from the tunnel will be removed and disposed of in accordance with waste management legislation. Preliminary analysis estimates that microtunnelling will progress at a rate of approximately 60m per week and that the tunnelling will take in the region of 12 months, which includes for site mobilisation. On completion of the construction works, proposed temporary construction compounds no. 9 and no. 10 will be dismantled and the ground will be reinstated to its original condition. The proposed area for temporary construction compounds no. 9 and no. 10 will require a plan area of approximate dimensions of 150m x 100m and will contain the following plant and facilities:

- *Office area including car parking;*
- *Launch (Jacking) shaft with Jacking station;*
- *Tunnelling equipment including:*
    - *o Tunnel Boring Machine (TBM);*
    - *o Control unit;*
    - *o Hydraulic pump units;*
    - *o Generators;*
    - *o Bentonite mixing plant; and*
    - *o Water separation plant;*
    - *Storage area for jacking pipes, fuel, bentonite;*
    - *Crane; and*
    - *Excavator.*

Microtunnelling will operate on a continuous 24-hour/7-day basis for the duration of the tunnelling works.

Based on the roosting and forage locations in relation to the compounds and the tunnel route the potential risk of disturbance is extremely likely. The only mitigation measure mentioned in the NIS in relation to the compounds is to fence them off and create a visual shield.

The potential disturbances cause by the tunnelling and placement of the compounds are listed below.

D1). The boring machine will operate 24/ this means human activity 24 hours 7 days a week and seismic output 24hours 7 days a week for 12 months. This is significant activity leaving no recuperation time form disturbance for the Birds.

Egg hatchings and fledgling are particularly vulnerable to seismic activities which may result in loss of eggs or young, dispersion from the nest site or rookery, and disruption of vital parent-offspring bonds.

The EU Commission took Spain to court of its failure to protect protected bird species from constant vibratory disturbance. The judgment was as follows:

"In the same Case, the Commission argues that the mining operations concerned are, by reason of the noise and vibrations which they produce and which are felt within the 'Alto Sil' SPA, likely significantly to

disturb the capercaillie population protected by virtue of that SPA. "It is apparent from the documents before the Court that, as the Advocate General has stated in point 88 of her Opinion, bearing in mind the relatively short distances between various 27 areas critical for the capercaillie and the open-cast mines in question, noise and vibrations caused by those operations are likely to be felt in those areas. It follows that those nuisances are capable of causing disturbances likely significantly to affect the objectives of the said directive, particularly the objectives of conserving the capercaillie". "The Kingdom of Spain expresses doubts in that regard by objecting that the decline in the populations of that species, including on the 'Alto Sil' site, has also been observed outside the mining basin and is even more marked there. However, that circumstance in itself does not prevent the said nuisances produced inside the SPA by the mining operations in question from being capable of having had significant impacts on that species, even if the decline of that species may have been greater yet for populations relatively distant from those operations". "The documents before the Court show that the abandonment of the 'Robledo El Chano' breeding ground, still occupied by the capercaillie in 1999, results from the operation of the 'Fonfría' open-cast mine as from 2001. That finding confirms that the operation of the mines in question, particularly the noises and vibrations produced, is capable of causing significant disturbances for that species. The Commission also argues that the open-cast mining operations contribute to isolating subpopulations of capercaillie by blocking communication corridors linking those subpopulations with other populations. It refers the report of December 2004 on the impact of mining operations on the Cantabrian capercaillie. "Since the Kingdom of Spain does not produce evidence refuting the conclusions of that report, the scientific value of which is undisputed, it must be held that the 'Feixolín', 'Fonfría' and 'Ampliación de Feixolín' operations are capable of producing a barrier effect likely to contribute to the fragmentation of the habitat of the capercaillie and the isolation of certain sub-populations of that species. "By allowing a situation which caused significant disturbances in the 'Alto Sil' SPA to continue for at least four years, the Kingdom of Spain omitted to take, in good time, the measures necessary to bring those disturbances to an end. Thus, the Kingdom of Spain can be accused of the failures to fulfil obligations under Article 6(2) of the Habitats Directive in so far as they concern the 'Ampliación de Feixolín' mine. (Case C-404/09, Commission v Spain, paragraphs 113 – 160)

D2). For security and Health and safety reasons the compounds will need to be lit 24/7 this introduces substantial disturbace to the SAC wildlife due to light pollution particularly to birds.It has been evidenced by some studies that artificial light pollution leads to changes in behaviour of animals, including birds. These changes can impact their reproductive health and potentially social interactions. A recent study conducted on Great Tits (*Parus major*) has found that light pollution alters the birds' night time activity. 44 birds were studied across 8 sites which were either unlit (a control) or had white, green or red light pollution. From the data collected, the results show that it was birds in areas with white light pollution that were the most affected. In fact the birds at white light locations were up to twice as active as birds in the other locations. Night time activity seemed to be limited to increased vigilance, being more alert and generally unsettled whilst perched. Not only this, but blood samples taken from the birds in the study, showed that those which were having higher activity during night time were more at risk of malaria infection. It is thought that increases in sleep deprivation are causing an increase in stress levels in the birds. This in turn lowers immunity and so the risk of infection is increased. Parent birds with malaria infection are less likely to fledge as many chicks due to their lower body condition. Article featured eyes on environment source. Ouyang J. Q. *et al* (2017) Restless roosts: light pollution affects behaviour, sleep and physiology in a free-living songbird. **Global Change Biology**, doi: 10.1111/gcb.13756

Scientifically backed impacts consisting of changes in behaviours, additional stress resulting in lowered immune systems and susceptibility to disease which impact on bird species numbers. It also allows predators to easily locate roosting birds and their young which will be detrimental to the reproduction of the species and directly contravene the conservations objectives regarding population numbers.

D3). Generators; and noise disturbance. Individually there may be the possibility of mitigation of constant generator noise but cumulatively with other disturbances this will also negatively impact local bird species.

D4). Bentonite mixing plant: these are large structures and the operation of these structures are also loud. The plant will have to be run 24/7 to provide a constant stream of bentonite slurry for the tunnel boring process. ANY level of leaks of bentonite into the SAC would be result in loss of habitat and cannot really be mitigated, as explained later in this submission.

D5). The Tunnel Boring Machine (TBM) will need to be retrieved once tunnelling is completed. This will involve the use of a crane, which will have to be erected and disassembled, and will take 1 month according to the NIS. Birds are notoriously nervous of objects moving above them and this will lead to disturbance from their normal feeding and foraging sites.

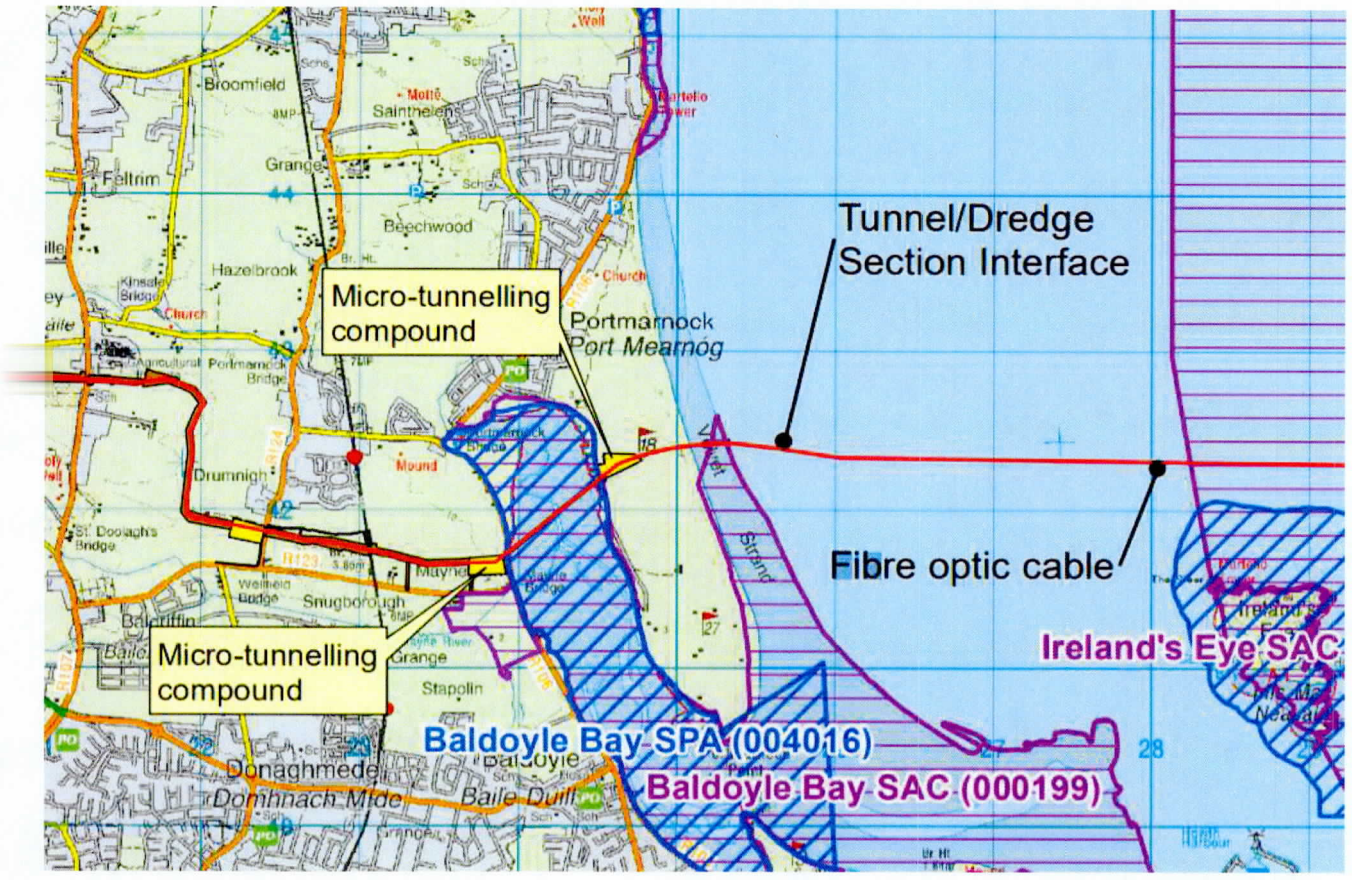


Figure 1. Location of micro-tunnelling construction compounds.

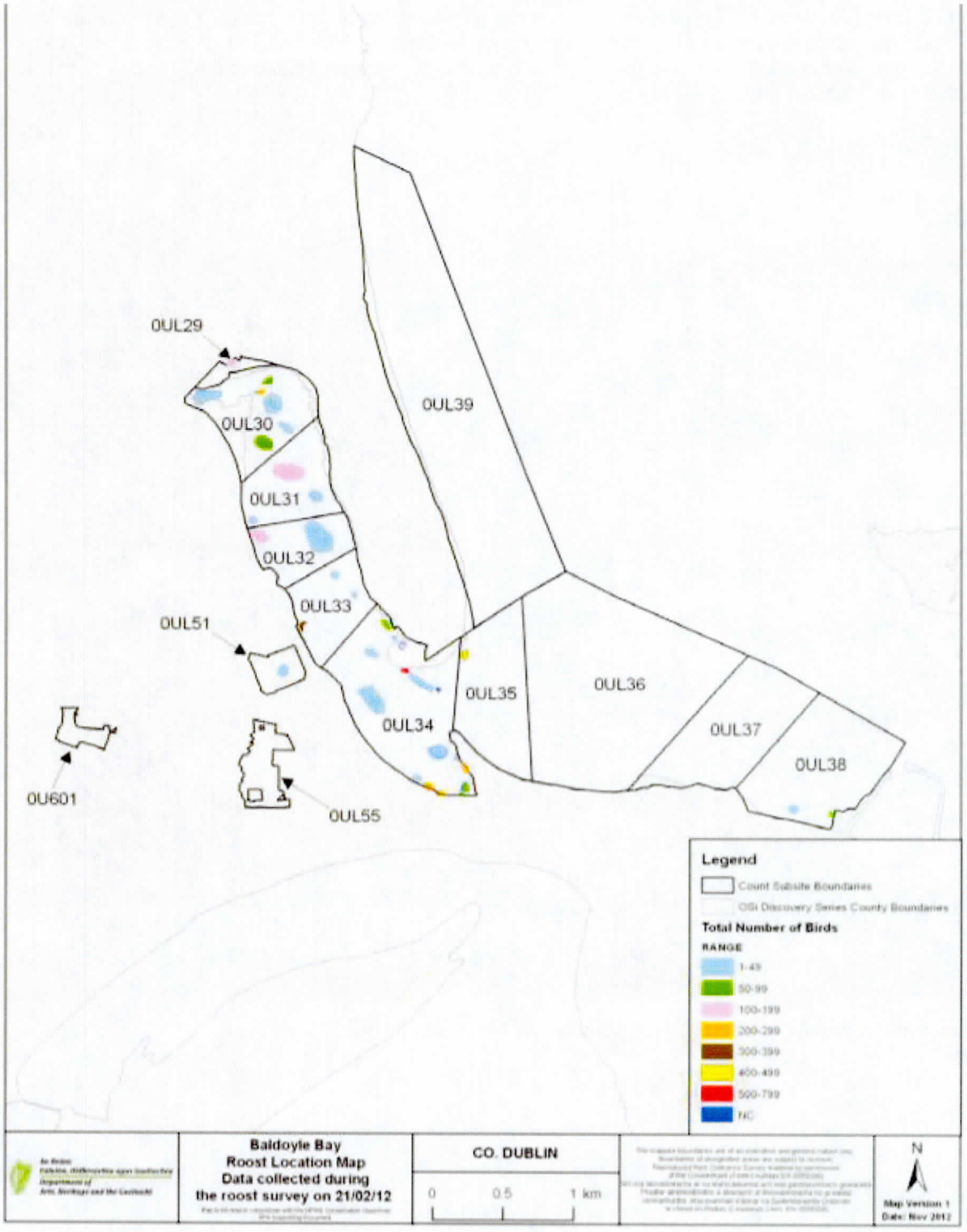


Figure 2. Roost location map.

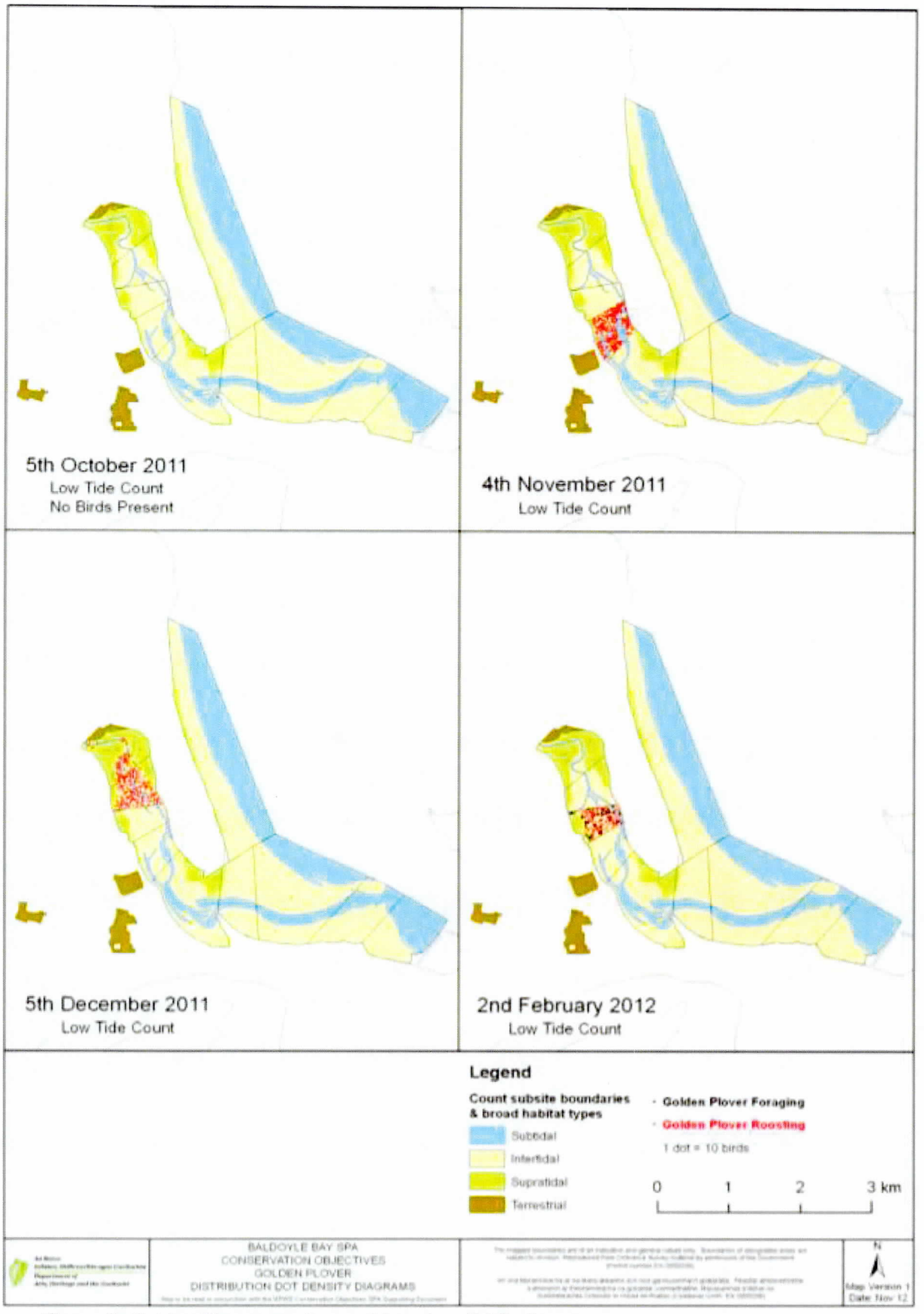


Figure 3. Golden Plover roosting and foraging distribution survey.

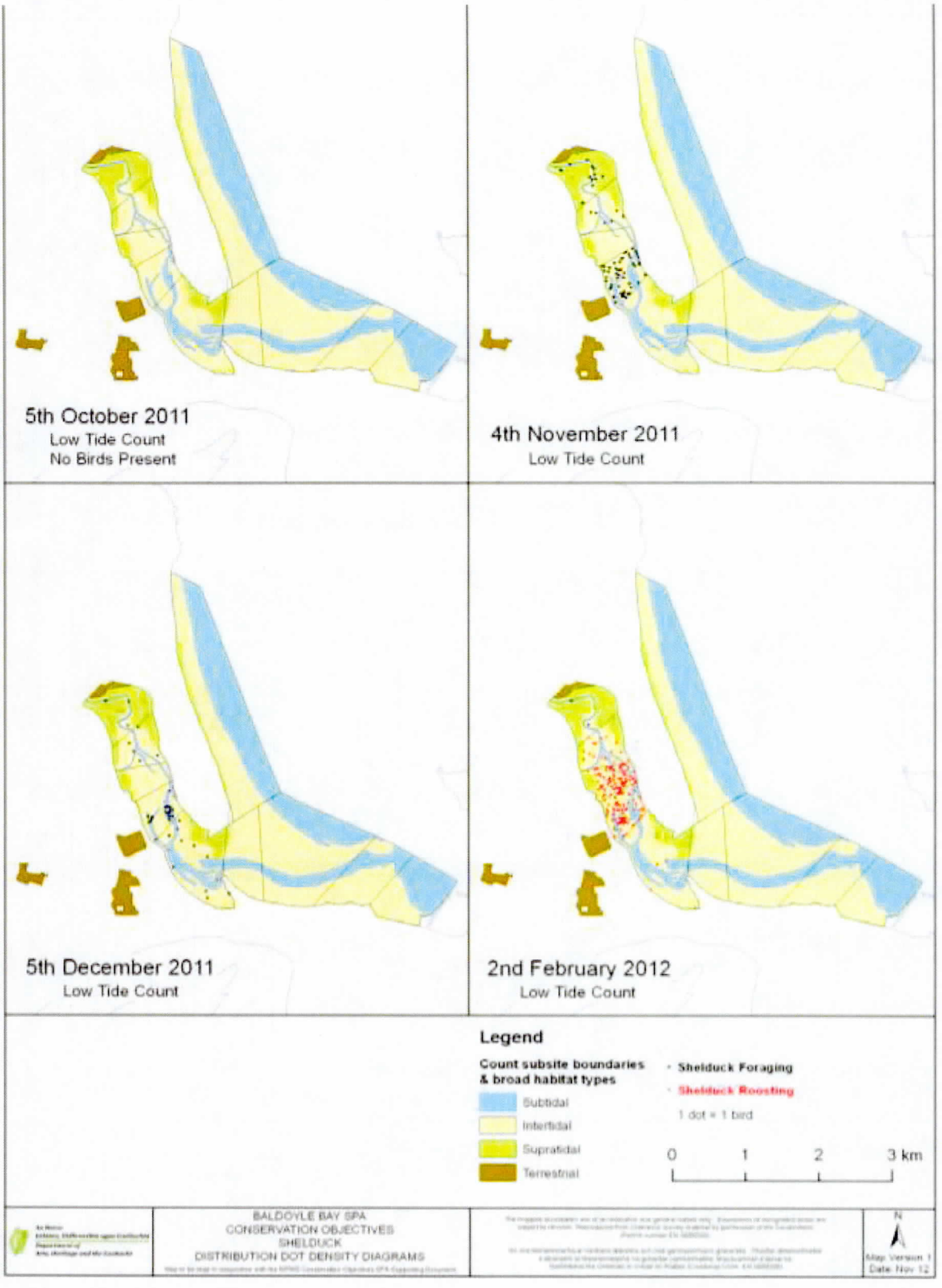


Figure4. Shelduck foraging and roosting survey.

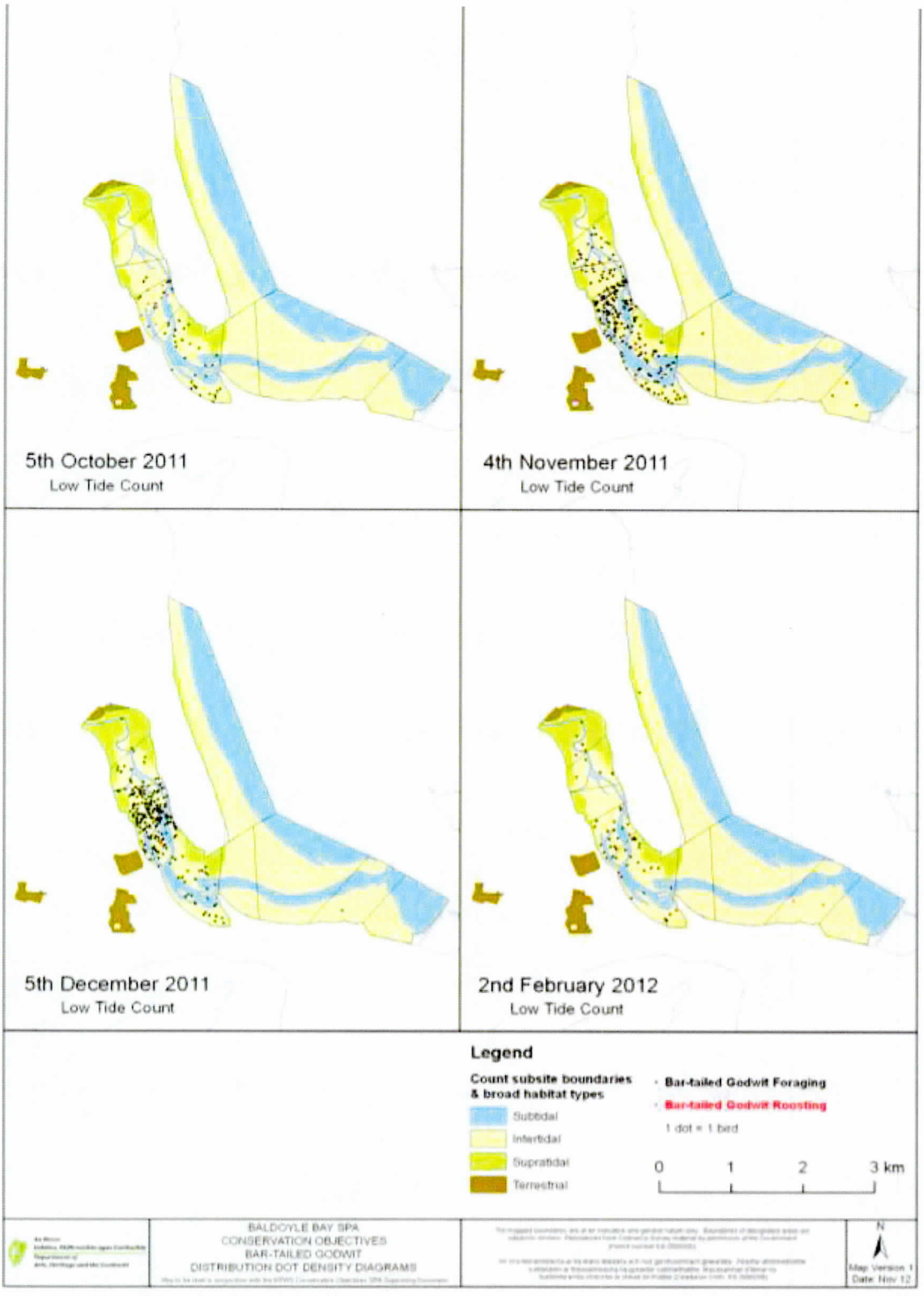


Figure 5. Bar-Tailed Goodwit foraging and roosting survey.

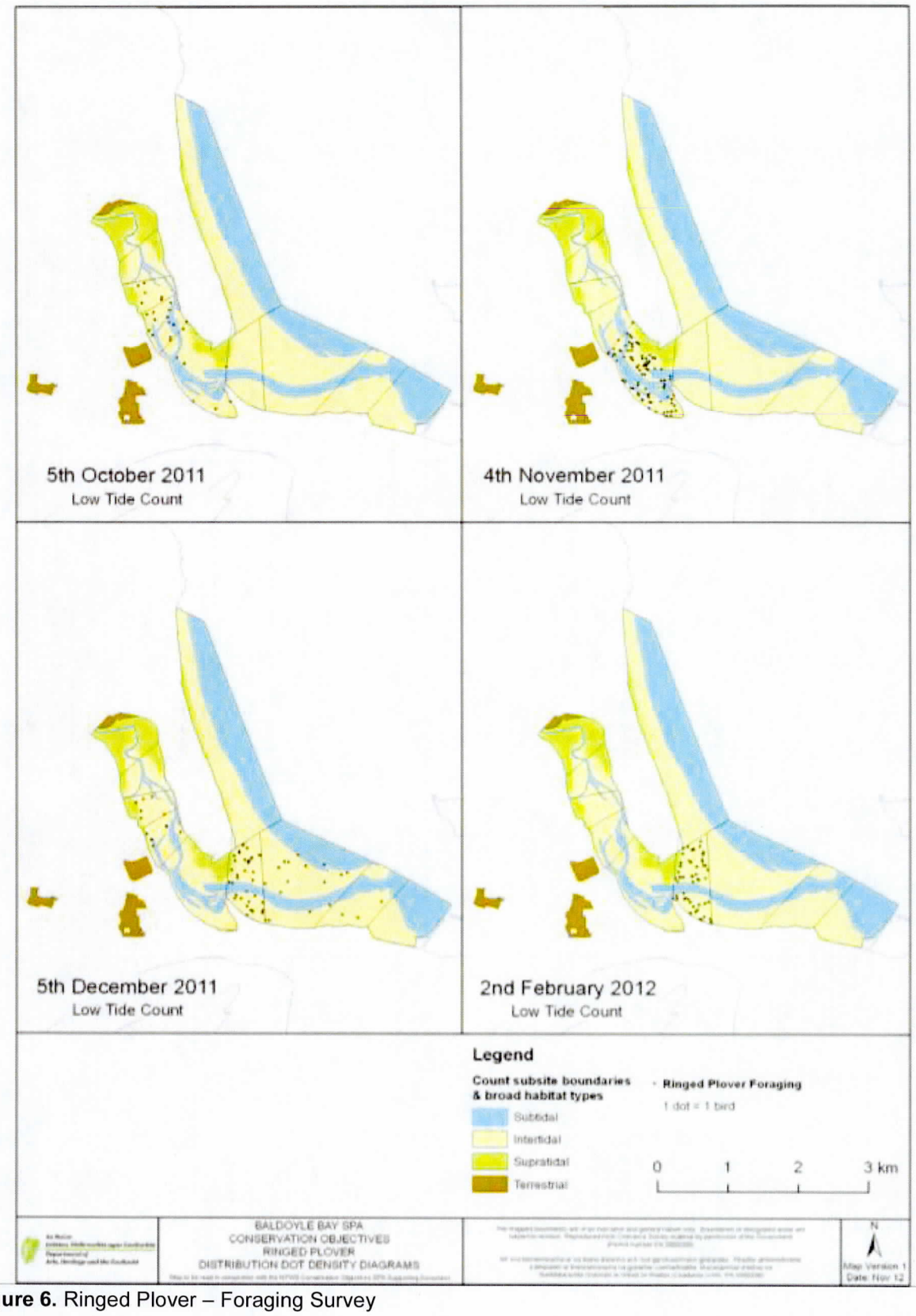


Figure 6. Ringed Plover – Foraging Survey

Figure 7. Light Bellied Brent Goose foraging and roosting survey

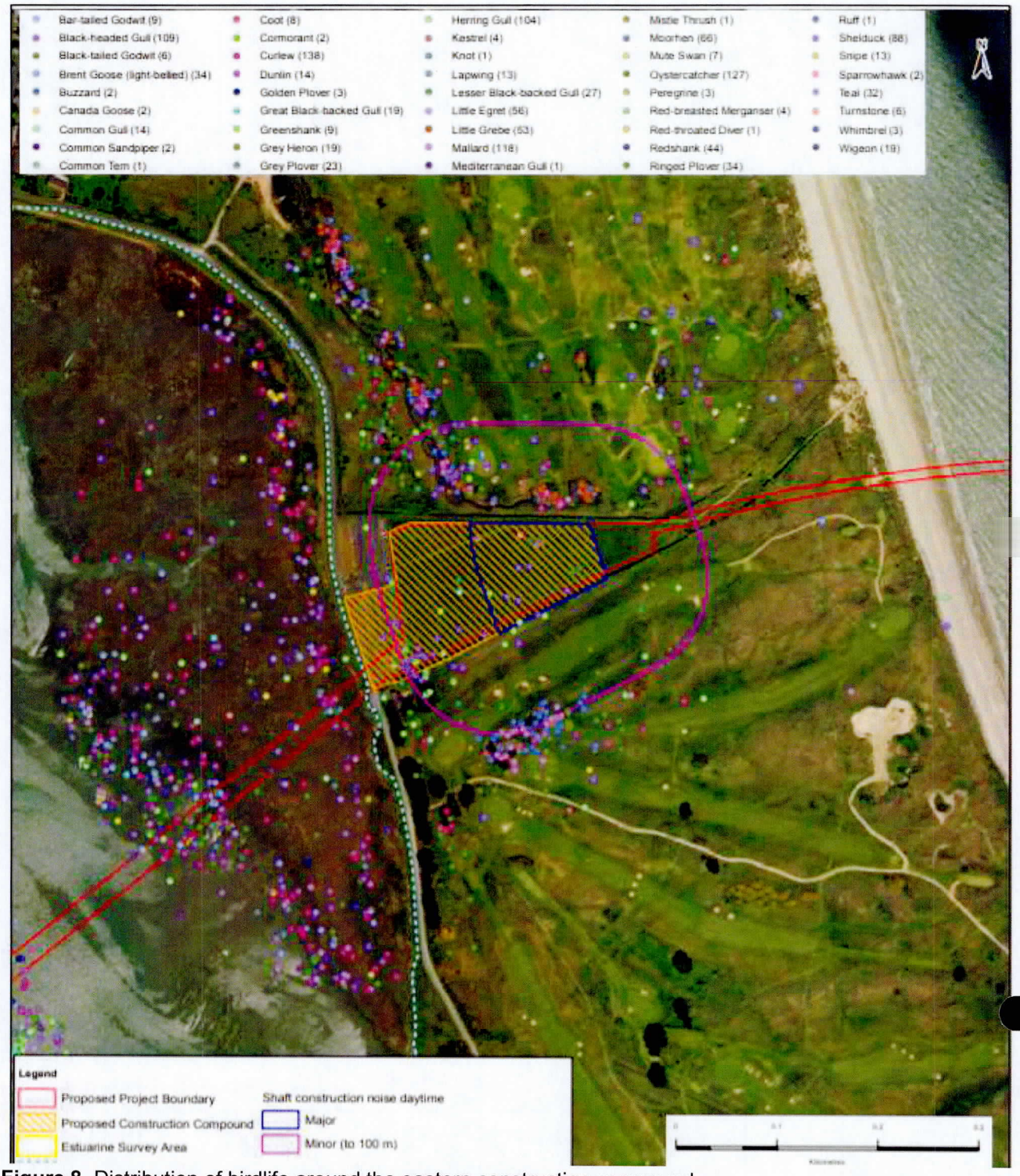


Figure 8. Distribution of birdlife around the eastern construction compound.

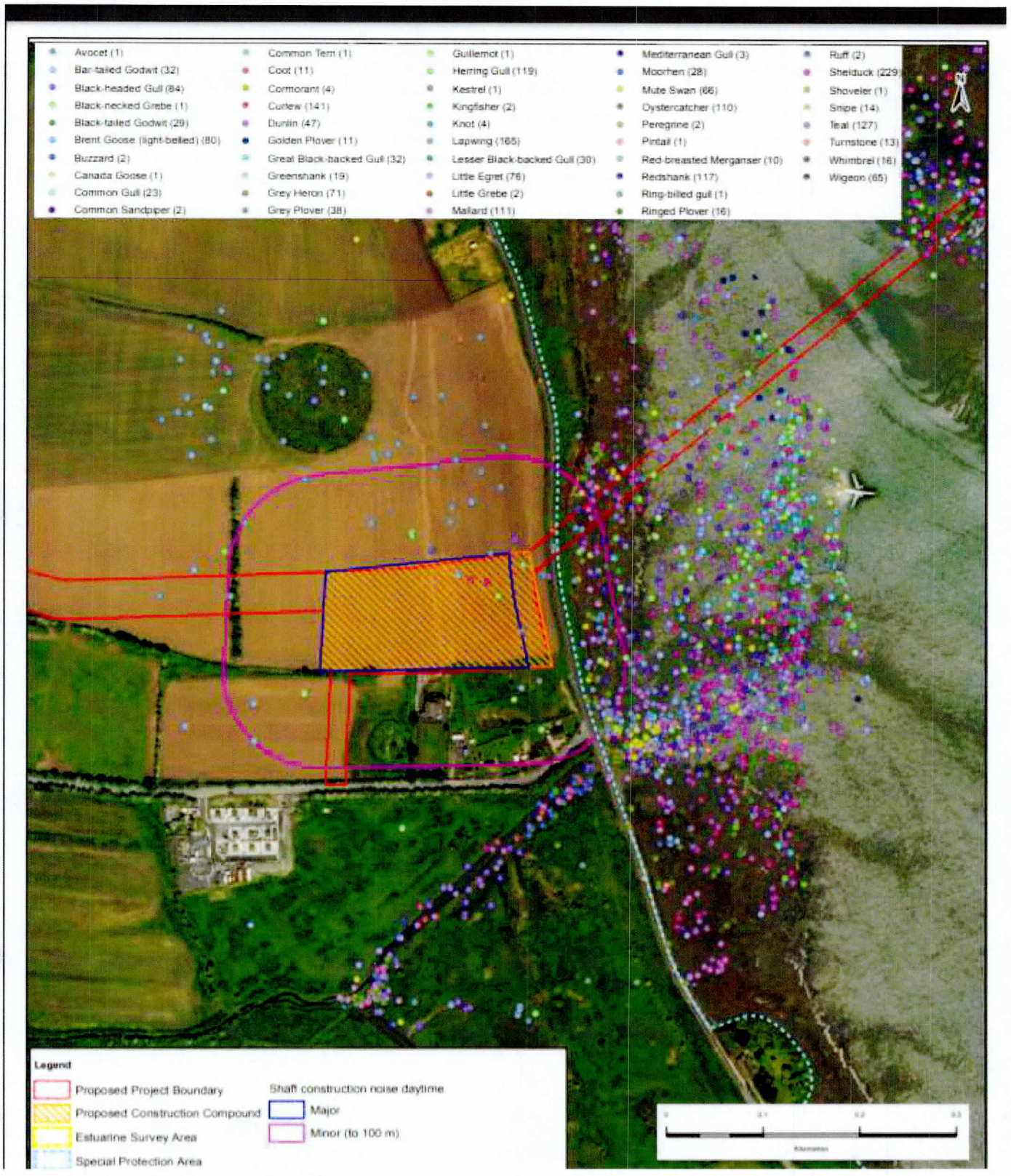


Figure 9. Distribution of birdlife around the western construction compound.

5. **Disturbance to protected Species via impacts on food sources.**

There is virtually no assessment in the NIS or EIAR of how the construction or operational phase will impact on the food sources of the protected bird and wildlife species within and adjacent to the SAC at Baldoyle and Irelands Eye. With such a complex Ecosystem even slight changes will have knock on effects on the predator / prey chain. However, in a project of this size those affect are immediate and long lasting. What follows is just one example of a food source that will be impacted by this project. If the food sources decline, then so will the population of the Birds and aquatic life contravening the conservation objectives and therefore article 6.2 of the directive.

Sandeels:
Page 65 of the Environmental Impact Assessment Report: Volume 3 Part A of 6: refers to the loss of habitat and significant negative impact on the sandeel population during construction phase.

"The area of the proposed outfall pipeline route (marine section) is considered a low intensity spawning and nursery ground for sandeel, and whilst local populations may potentially be affected by habitat loss and disturbance through sediment excavation and deposition during dredging and trenching activities (Ellis et al. 2010; 2012), this is likely to have a minimal impact to the wider Irish Sea population." It goes on to say:

"Sandeel, as a generally sedentary species, may be less able to avoid physical disturbance than others, particularly after spawning when they reportedly remain in their burrows for approximately two months. Their specific substrate requirements are very limiting to their distribution, hence the renowned patchiness. They have been found to be adversely affected in areas with sediment containing >2% silt. Dredging and temporary storage of dredged materials on the seabed may cause smothering of sandeel habitat and could potentially affect the local substrate composition through disturbance of the seabed and potentially increasing suspended sediment concentrations. Overall, the sandeel effect-receptor interaction is expected to be low. Adult and juvenile sandeel are considered to be of medium vulnerability and high recoverability and may be of regional importance in terms of a prey source."

The sandeel is indeed of regional importance and although the sandeel itself is low vulnerability, it is a staple food source for a wide range of seabirds, including puffins, razorbills, shags, guillemots and kittiwakes, who feed on shoals of sandeels. Three of these species are protected as part of the Irelands Eye SAC. It is also an important food source for the Harbour Porpoise also a protected marine species It is an indirect effect that will cause significant negative impact to the population trend of these species, and if taken in cumulation with other negative impacts as per Article 6.3 of the habitats Directive, would be significant enough to prevent the granting of the application.

6. **Disturbance of Harbour Porpoise:**
The proposed project will have several negative significant impacts on the Harbour Porpoise, despite the EIAR opinion to the contrary. As is indicated in Figure Eleven an illustration of the Harbour porpoise survey as part of the EIAR, the Harbour porpoise is very active in the area, to such an extent that the Rockabill SAC it is listed as a protected species. As has already been pointed out the porpoise will have a food source affected by the dredging of the outfall pipe during construction, but it will also be greatly affected by the piling and tunnelling aspect of the project. Although the EIS plays down the impact of vibration and noise disturbance it dues admit it as an impact.

EIAR states: The noise created during construction has the potential to impact sensitive receptors within the proposed outfall pipeline route (marine section) construction corridor through injury from noise or avoidance. Sensitive receptors include nursery fish species, pinnipeds (seals) and cetaceans, in particular the harbour porpoise. The proposed outfall pipeline route (marine section) falls within the Rockabill to Dalkey Island SAC;

It confirms further impacts*: The duration of the Construction Phase could affect the seasonal migration of important marine species, including salmonids and the harbour porpoise, nursery fish species in the area or the breeding season of seabirds nesting on Ireland's Eye SPA;*

The EIAR concludes that the noise level of tunnelling will have no impact on the harbour porpoise however it does not mention other impacts caused by dredging these negative impacts are backed by recent

scientific research which confirmed that prolonged tunnelling and dredging displaces harbour Porpoises for long periods, which is in contravention of the conservation interest for the Rockabill SAC.

Sound exposure levels from such operations are thought to be well below that expected to cause injury to a marine mammal. However, noise generated by dredging, from the physical presence of the dredger, and possibly from the increased water turbidity in the area of operations have the potential to cause low level disturbance such as masking or behavioural impacts such as displacement.

A review of the literature on the effects of dredging on marine mammals found that previous work in Aberdeen Harbour showed a clear avoidance response by bottlenose dolphins to dredging activity in a highly urbanised foraging patch (Pirotta et al. 2013). Given the level of vessel activity in the harbour, these dolphins were expected to show a high level of tolerance towards disturbance at the site, but results showed dolphins spending proportionally less time in the harbour as the intensity of dredging activity increased and in one year with dolphins leaving the harbour completely for approximately five weeks during the dredge works (Pirotta et al. 2013).

Additionally, in this review, Todd et al. (2014) highlight that with respect to sound from dredging activities, a marine mammals' response is likely to depend on types of dredger used, state of operation, local sound propagation conditions, and the receiver characteristics with regard to the sensitivity and bandwidth of hearing. The authors go on to say that noise from dredging is usually below suspected injury thresholds or PTS (exposure criteria from Southall et al., 2007); however, TTS cannot be ruled out if marine mammals are exposed to noise for prolonged periods [as highlighted in a study on effects of long-term exposure in harbour porpoises; Kastelein et al. (2012)).

The final impact on the harbour porpoise will take effect during the operational phase. When the outfall pipe is pumping secondary treated effluent into unusually shallow waters off Portmarnock beach, a popular bathing spot. See Figure 10. which clearly illustrates how the depth of the area where the outfall pipe is located, only just falls into the 15-10 metre bracket just before the outfall diffusion point. Most of the area is in 5-10 metre depth and the remaining area is exposed during low tide.

Harbour porpoise are exceptionally susceptible to sewage pollution. According to research undertaken by the Canadian Federal governments environmental section, marine contamination is a serious threat to population levels;

"Contamination can occur in the form of marine debris, anthropogenic biological pollutants (e.g. sewage outflow) or via chemical contamination of habitat or prey. Harbour porpoise have been known to ingest plastic debris, and in some cases, this has resulted in death (Baird and Hooker 2000).

Small cetaceans lack the metabolic capacity to degrade or excrete pollutants and thus retain high quantities in their systems (Tanabe et al. 1988). These pollutants may increase the risk of immune-suppression (Hall et al. 2005), and potentially reduce reproductive capabilities and neonate survival. The historical and emerging effects of marine contamination from polluting activities on harbour porpoise populations are uncertain, though given the likelihood of localized hotspots of contamination in harbour porpoise habitat, this threat is rated at medium to high level of concern. Regulations and monitoring of point sources of contamination can alleviate some concern for this threat; however, long-term chronic exposure to pollutants (both regulated and unregulated) creates uncertainty regarding effects to long-term reproductive health of this population.

Biological pollution may occur in the form of nutrient-loading, hormones and antibiotic contamination entering the marine environment via sewage outflow, agricultural and other sources. Introduction of foreign diseases into a population of highly social cetaceans may result in disease outbreaks leading to population decline (Guimarés et al. 2007). As there is some suggestion that harbour porpoise may have a polygynandrous mating system (Grier and Burk 1992), they may be vulnerable to outbreaks of highly contagious diseases. As occurrence of disease may be the result of natural pathogens in the environment, or from anthropogenic nutrient-loading or introduction of foreign pathogens, sources of biological pollutants should be assessed and monitored to effect adequate mitigation of those anthropogenic threats. Exposures to contagions or other biological pollution may lead to negative synergistic effects with other stresses."

The above research indicates clear scientific proof that an increase in effluent pollution in habitat waters in particular that which is not treated to remove pathogens, would be fatal to maintaining the population of the Harbour Porpoise in the marine environment surrounding the outfall site. This impact alone should deem the application incompatible with Article 6 of the Habitats Directive.

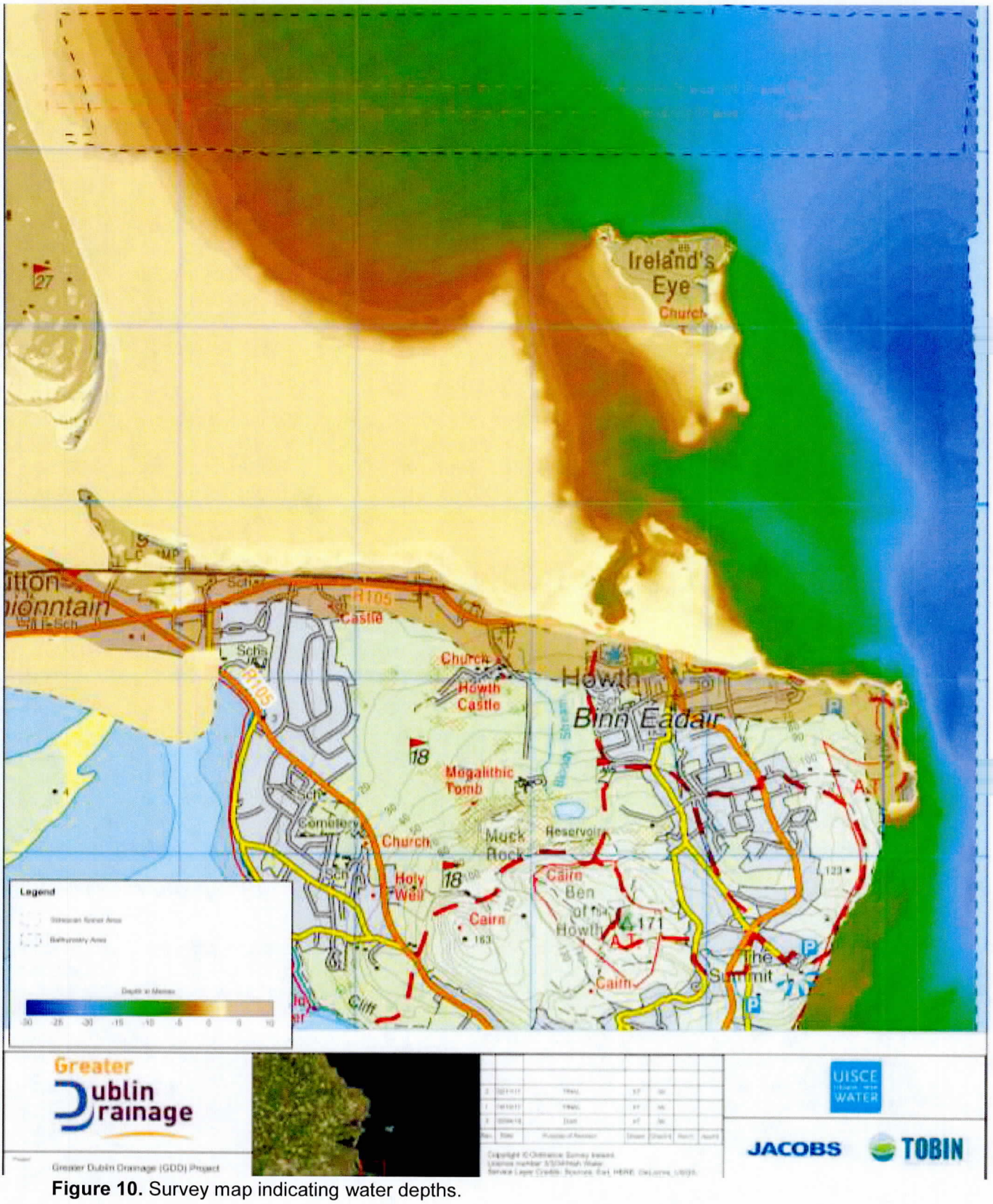


Figure 10. Survey map indicating water depths.

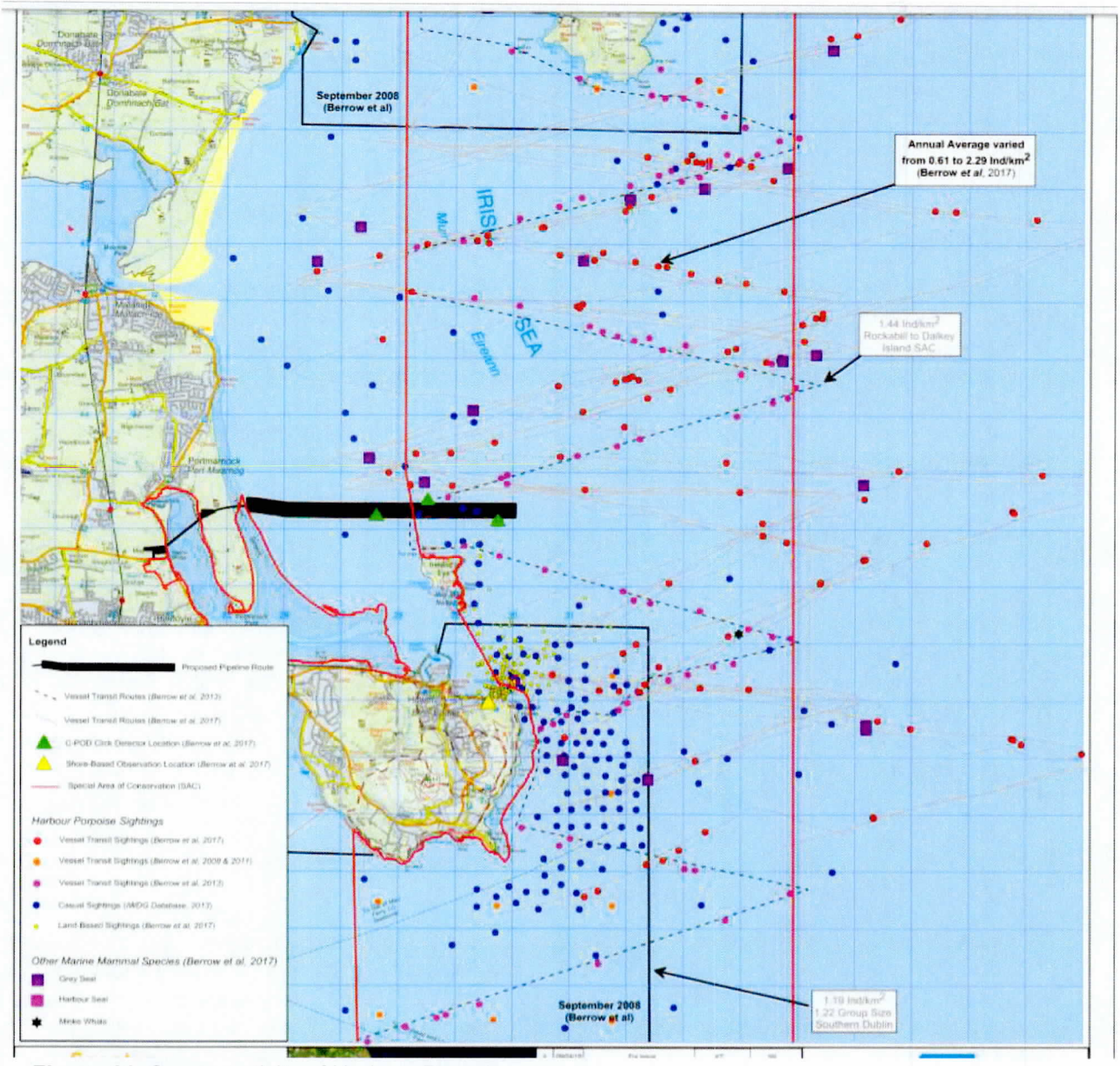


Figure 11. Survey activity of Harbour Porpoise

7. Impacts on Habitat.

Bentonite Pollution: The NIS lists a bentonite leak as being a likely significant effect "*Possible deterioration of water quality of estuarine habitats due to pollution events or suspended sediment plumes during construction of marine project elements including bentonite blowout or surface venting.*"

NIS also States;

"6.2.1.3.3 Bentonite Release. The risk of a surface breakout by bentonite drilling fluid cannot be negated completely due to variability in the underlying geology. Bentonite is used during the drilling operation to lubricate during micro-tunnelling or TBM progress during construction and is pumped into the cuttings annulus during operations at the ambient pressure at the rock face. A detailed geophysical survey has been carried out along the proposed route in order to anticipate the risk of weak formations and possible faults that may increase the risk of a bentonite breakout. However, should the TBM encounter voids within the formation (such as a fissure or weathered area of rock), and then material can be forced to the surface under pressure to create a breakout. In the littoral and sub-littoral environments, the presence of bentonite at the surface can have a notable impact on sediment turbidity and suspended load. This increase in turbidity could result in increased siltation and the smothering of sediments and organisms accompanied by a reduction in the light available to the seabed for photosynthesis."

The next section of the NIS also confirms the potential for habitat loss.

"6.4.1.1 Assessment Section 6.2.1.3 describes the Likely Significant Effects arising from bentonite release and surface venting (air breakout) on water quality. Whilst both would affect water quality, there remains a small potential for habitat loss to occur through damage or disruption to the saltmarsh vegetation or benthos."

The mitigation measures in the case of a breakout according to the NIS are as follows:

"*The control and management of pressures during the micro tunnelling processes is undertaken to prevent air and bentonite breakouts. However, in the unlikely event of a bentonite breakout occurring, which results in a saltmarsh area high up on the foreshore being covered, intervention will be required. Intervention will involve washing the vegetation using a seawater pump and spray. Typically, this would be carried out during a high water period where washings can disperse out of the estuary naturally. Sites will only be accessed by foot 32102902/NIS 121 (without the use of plant). Should bentonite breakout in a saltmarsh area lower down on the shoreline in areas routinely covered by seawater, this will be left to disperse naturally over the tidal cycle. "*

The mitigation measures outlines above cannot really be considered mitigation. Once a spill occurs the damage is immediate and there is no time to mitigate. Bentonite although not toxic will sink and create a sediment layer over the estuary (mudflats/ saltmarsh etc) and smother and kill any aquatic life that cannot avoid the spill (as happened in the Marys River in Corvallis, Oregan, USA when drilling for a natural gas pipeline. It took two weeks to clean up). This would include smaller fish and invertebrates. It would not be possible to immediately clear the breakout to prevent the loss of aquatic life. "mitigation" would merely involve trying to clear/ collect the bentonite which in itself would incur significant disturbance to plant, bird and animal life in the estuary in addition to a depletion of food sources. Neither the applicant or the competent authority can guarantee that such an event will not take place. As such the potential risk of such an event within the actual SAC area would disallow granting of permission for the application.

8. Eutrophication impacts on the Estuarine system

As the proposed secondary treatment will not remove nutrients and phosphates there is a very real danger of Eutrophication in the areas of the WWTF outfall pipe which will again catastrophically affect the delicate ecosystem. The EIAR states that if the outfall pipe was west of Ireland eye, there would be *unacceptable impact on Baldoyle SAC* based on tidal modelling (Figure 12). It goes on to say that for that reason an outfall site, east of Irelands Eye was chosen. HOWEVER, it does not detail the impact of effluent flowing from this point will have on the SAC it merely implies that it will be less of than the western site.

Tide and Current Patterns

Modelling of the discharge from the proposed long sea outfall discharge point predicts an imperceptible impact on the receiving waters from the proposed operation of the proposed outfall pipeline route (marines section) discharge point.

Phase 1 modelling also indicated that outfall locations west of Ireland's Eye in the southern outfall study area would have unacceptable levels of impact on environmentally sensitive areas in the study area such as Baldoyle Bay SAC/SPA, Sutton/Burrow Beach, Velvet Strand, Malahide Estuary, Malahide Beach, and Ireland's Eye SPA. Refer to Diagram 5-2 for example of extent of predicted impacts.

Examination of tide and current patterns in this area as predicted by the Proposed Project model and information supplied by Howth Yacht Club suggest that there is potential for material discharged west of Ireland's Eye to remain circulating within the area west of Ireland's Eye rather than disperse in to the broader body of the Irish Sea. Nutrients

in a treated wastewater discharging west of Ireland's Eye could therefore accumulate within Baldoyle Bay Estuary leading to algal blooms and eutrophication.

Ultraviolet treatment would also have to be provided to treated wastewater discharging west of Ireland's Eye to protect the bathing waters at Portmarnock (Velvet) Strand from microbial contamination as a result of the circulating current patterns.

For those reasons, a discharge point east of Ireland's eye is the preferred option.

Figure 12. EIAR Excerpt -Unacceptable impacts on Baldoyle bay SAC from effluent

The fact that there will be a substantial increase in nutrients and phosphorus in this area where there was previously none would by way of deductive reasoning, imply that there will be an impact from eutrophication. At low tide there is a very real chance that effluent will drain back into the estuary when the htide comes in particularly in light of the channel that leads from the sea to the estuary.(see Figure 13.

Figure 13. Baldoyle SAC

One indirect impact that couldprove catastrophic to the salt marshes in Baldoyle estuary SAC involves the species Hediste Divericolor. Scientific research in three estuaries in south east England supported the hypothesis that nutrient enrichment promotes surface deposit feeding, over suspension feeding and predation. Deposit feeding damages the saltmarshes resulting in loss of that protected habitat type. As Hediste Divericolor are a prominent food source in Baldoyle SAC this is a very real prospect if the project goes ahead.

At sewage-polluted sites in three estuaries in SE England Hediste mainly consumed microphytobenthos, sediment organic matter and filamentous macroalgae Ulva spp. At cleaner sites Hediste relied more on suspension feeding and consumption of Spartina anglica. There were no consistent differences in Hediste densities between the polluted and cleaner sites, probably because of increased densities at the cleaner sites too, facilitated by the planting of Spartina and nitrogen enrichment there too, including from agricultural run-off. Increased nutrient enrichment and the artificial availability of Spartina have probably increased densities of, and deposit-feeding by, Hediste in the past half-century and contributed indirectly to saltmarsh losses, since deposit-feeding by Hediste has been implicated in recent saltmarsh erosion in SE England M. J. R. Aberson, Stefan George Bolam, Rob G. Hughes

9. Release of Raw Sewage.

Even though the EIAR and NIS state there will be no impacts from the operational stage, nowhere does it discuss the impact on the SACs in the event of a major release of raw sewage. Usually flood risk modelling indicate a 1 in 100 year event however due to climate change it is very apparent that these events are become much more frequent. Portmarnock alone has had 4-5 do not swim notices when raw sewage was released due to heavy rain and pump failure. It would be impossible for Irish Water to guarantee that raw sewage will never be released from this development into the receiving waters that surround Baldoyle SAC and Ireland Eye SAC. As the applicant cannot guarantee that there will be no release of raw sewage the competent authority have to base their assessment of this application on the presumption that this significant major negative impact will happen. Due to the size of this WWTP the volume of raw sewage that would be released in the event of failure of machinery or a rainfall event is likely to cause irreversible damage and subsequent loss of habitat and species to Baldoyle SAC and Ireland Eye SAC.

10. Article 6.3 of the Habitats Directive - Cumulative Impacts.

There is substantial case law on Cumulative impacts. The most important of which being the following.

"*Such an assessment therefore implies that all the aspects of the plan or project which can, either individually or in combination with other plans or projects, affect those (conservation) objectives must be identified in the light of the best scientific knowledge in the field. Those objectives may, as is clear from Articles 3 and 4 of the Habitats Directive, in particular Article 4(4), be established on the basis, inter alia, of the importance of the sites for the maintenance or restoration at a favourable conservation status of a natural habitat type in Annex I to that directive or a species in Annex II thereto and for the coherence of Natura 2000, and of the threats of degradation or destruction to which they are exposed.*" "*As regards the conditions under which a particular activity may be authorised, it lies with the competent national authorities, in the light of the conclusions of the assessment of the implications of a plan or project for the site concerned, to approve the plan or project only after having made sure that it will not adversely affect the integrity of that site. It is therefore apparent that the plan or project in question may be granted authorisation only on the condition that the competent national authorities are convinced that it will not adversely affect the integrity of the site concerned.* ***Where doubt remains as to the absence of adverse effects on the integrity of the site linked to the plan or project being considered, the competent authority will have to refuse authorisation***.*" 38 "In this respect, it is clear that the authorisation criterion laid down in the second sentence of Article 6(3) integrates the precautionary principle (see Case C-157/96 National Farmers' Union and Others [1998] ECR I- 2211, paragraph 63) and makes it possible effectively to prevent adverse effects on the integrity of protected sites as the result of the plans or projects being considered. A less stringent authorisation criterion than that in question could not as effectively ensure the fulfilment of the objective of site protection intended under that provision.*" "*Therefore, pursuant to Article 6(3), the*

competent national authorities, taking account of the conclusions of the appropriate assessment of the given project for the site concerned, in the light of the site's conservation objectives, are to authorise such activity only if they have made certain that it will not adversely affect the integrity of that site. That is the case where no reasonable scientific doubt remains as to the absence of such effects (see, by analogy, Case C-236/01 Monsanto Agricoltura Italia and Others [2003] ECR I-8105, paragraphs 106 and 113)." "It can be concluded that under Article 6(3) of the Habitats Directive, an appropriate assessment of the implications for the site concerned of the plan or project implies that, prior to its approval, all the aspects of the plan or project which can, by themselves or in combination with other plans or projects, affect the site's conservation objectives must be identified in the light of the best scientific knowledge in the field. The competent national authorities, taking account of the appropriate assessment of the implications of mechanical cockle fishing for the site concerned in the light of the site's conservation objectives, are to authorise such an activity only if they have made certain that it will not adversely affect the integrity of that site. That is the case where no reasonable scientific doubt remains as to the absence of such effects. (Case C-127/02 Waddenvereniging and Vogelbeschermingsvereniging, paragraphs 52 - 61)

The applicant's assessment of cumulative impacts and mitigation for same is poor. In many cases the same text is cut and pasted over and over rather than individualised assessment being made.

The list also fails to mention the following:

- upcoming Airport Noise Regulation Bill, which would remove current restrictions on the number on night flights in and out of Dublin airport on the existing and proposed second runway. At present night flights over the Baldoyle SAC are severely restricted, once they are removed it will cause considerable disturbance to the roosting bird population.

- The increase in the number of individual outfall pipes releasing surface water into the Mayne and Sluice rivers from current and proposed residential developments. These surface waters contain Hydrocarbons, hard metals, pesticides and herbicides which in cumulation with other impacts could lead to habitat degradation and loss at Baldoyle SAC.

- The Natura Impact statement for Dublin city Development plan 2016-2022 clearly states that the plan will have an impact on Baldoyle SAC. It lists the impact as:
  Urban development and Recreational pressure in the north east area of the plan area in combination with other plans and projects may result in adverse impacts on the integrity of the European Site Taking account of the proximity of the proposed plan to the qualifying interests of the site, there is the potential for significant effects arising from the policies and objectives associated with the proposed plan.

11. Article 6.4 of the Habitats Directive:

"If, in spite of a negative assessment of the implications for the site and in the absence of alternative solutions, a plan or project must nevertheless be carried out for imperative reasons of overriding public interest, including those of a social or economic nature, the Member State shall take all compensatory measures necessary to ensure that the overall coherence of Natura 2000 is protected. It shall inform the Commission of the compensatory measures adopted. Where the site concerned hosts a priority natural habitat type and/or a priority species, the only considerations which may be raised are those relating to human health or public safety, to beneficial consequences of primary importance for the environment or, further to an opinion from the Commission, to other imperative reasons of overriding public interest."

I would like to point out finally that this application can not be granted under article 6.4 of the Habitats directive as there are alternative solutions. This preferred site was chosen from 3 based on economic grounds. The phase 4 report on preferred site selection states:

"The ASA Phase 4 process has determined that it is technically feasible to construct all three site options. However, it was identified that all site options have, to varying degrees, 'less favourable' classification under the range of Environmental, Technical and Cost criteria considered."
It further states that;

"The landfall area of the northern outfall location is considered to have less ecological sensitivity in comparison to the landfall area of southern outfall location." And
"Under Cost criteria preliminary cost estimates indicate that the substantially lowest and therefore 'more favourable' cost is associated with the Clonshagh site option."

In light of the alternatives of two other preferred site options article 6.4 cannot be applied to this application. Below is an additional judgment which re-enforces this opinion.

The absence of alternatives must be demonstrated Findings of the Court: "Article 6(4) of the Habitats Directive provides that, if, in spite of a negative assessment carried out pursuant to the first sentence of Article 6(3) and in the absence of alternative solutions, a plan or project must nevertheless be carried out for imperative reasons of overriding public interest, the Member State is to take all compensatory measures necessary to ensure that the overall coherence of Natura 2000 is protected. That provision, which permits a plan or project which has given rise to a negative assessment under the first sentence of Article 6(3) to be implemented on certain conditions, must, as a derogation from the criterion for authorisation laid down in the second sentence of Article 6(3), be interpreted strictly. 56 "Thus, the implementation of a plan or project under Article 6(4) is, inter alia, subject to the condition that the absence of alternative solutions be demonstrated. In the present case, it is common ground that the Portuguese authorities examined and rejected a number of solutions whose routes bypassed the settlements surrounding the Castro Verde SPA but crossing the western side of it". "On the other hand, it is not apparent from the file that those authorities examined solutions falling outside that SPA and to the west of the settlements, although, on the basis of information supplied by the Commission, it cannot be ruled out immediately that such solutions were capable of amounting to alternative solutions within the meaning of Article 6(4), even if they were, as asserted by the Portuguese Republic, liable to present certain difficulties. Accordingly, by failing to examine that type of solution, the Portuguese authorities did not demonstrate the absence of alternative solutions within the meaning of that provision." (Case C-239/04 Commission v Portugal, paragraphs 25 – 39)

Summary:
The individual potential significant impacts listed in this submission would be enough to withhold authorisation of the application under Article 6 of the habitats Directive, but in combination with each other and other projects it is a certainty that the project would adversely affect the integrity of the Baldoyle Bay SAC and SPA , Irelands Eye SAC and SPA and Rockabill SAC/ SPA.

Going forward it is imperative that Ireland Competent Authority take the responsibility of applying the legislation of the Habitats directive at planning stage and do not redirect responsibility for enforcing the legislation to the Irish or European Courts.

1·3

Greater Dublin Drainage Project

SID Application

ABP Case file 312131

Appendix Reference:

1·3

Appendix Description:

Sabrina Joyce-Kemper submission 7th June 2024

1.3

SID Submission by: Sabrina Joyce-Kemper
23 Portmarnock Crescent
Portmarnock
Co. Dublin.

SID Submission in reference to: Greater Dublin Drainage Project consisting of a new wastewater treatment plant, sludge hub centre, orbital sewer, outfall pipeline and regional biosolids storage facility

Case reference: PL06F.301908

In light of the documents added at a later date and further to my previous submission (receipt attached) in relation to the above planning application, I wish to make the following points in opposition to the Development;

A). Tides.

In these documents the applicant states that they took information from Howth Yacht club into consideration when establishing tidal movements. However, the very basic information contained in the hydrology documents is at odds with the tidal maps that Howth yacht club have produced for sailors for navigation purposes. Which are laid out at Fig. 1, Fig 2, Fig 3 and Fig 4. These tidal maps (available on Howth yacht club website) very clearly show that the waters where the effluent will exit the outfall via the diffuser will be swept directly into Portmarnock beach (designated and protected bathing waters) Fig 2. on the flood Tide. This raises significant concerns about the impact that the operational phase of the project will have on sensitive waters and protected Habitats. In light of this tidal information it can be considered certain that an untreated release of effluent due to a technical issue at the plant or heavy rain surge will carry a large nutrient load into these waters and altering the habitat via contamination and eutrophication.

Flood Tide: These maps (Figs 1 and 2) clearly show that during the Flood Tide, effluent will be swept into the very shallow bathing waters of Portmarnock beach and Baldoyle Bay. The waters closer to Irelands Eye also stay circling the outfall location to the left of point K and get trapped in the shallow waters between SAC/ SPA of Irelands Eye and the SAC/ SPA of Baldoyle Estuary.

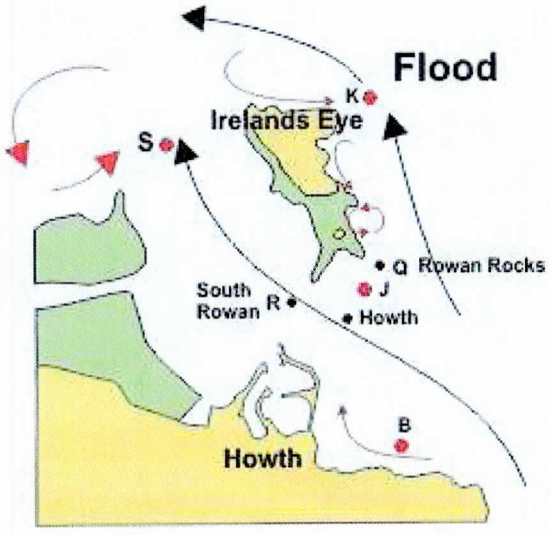


Figure 1.

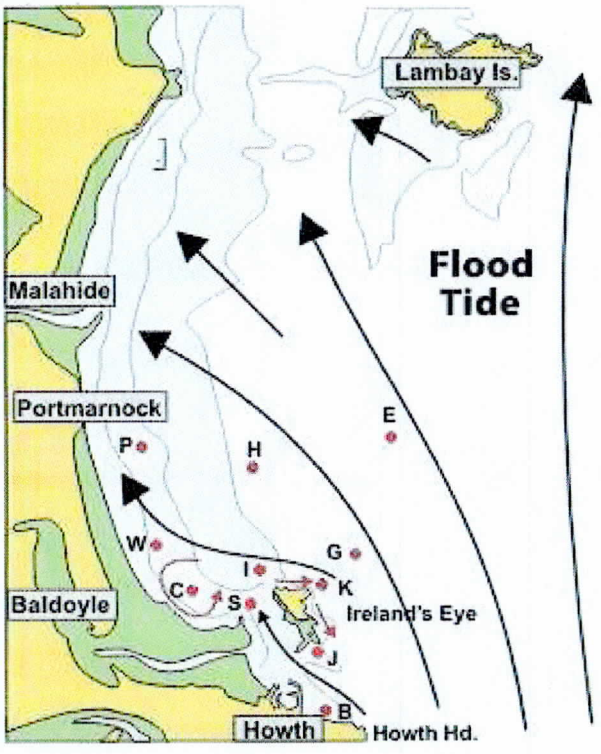


Figure 2.

The Ebb Tide:

Figs. 3 and 4 show how the Ebb tide pushes the effluent back towards the SPA on Irelands Eye and around Howth Head into Dublin Bay Biosphere.

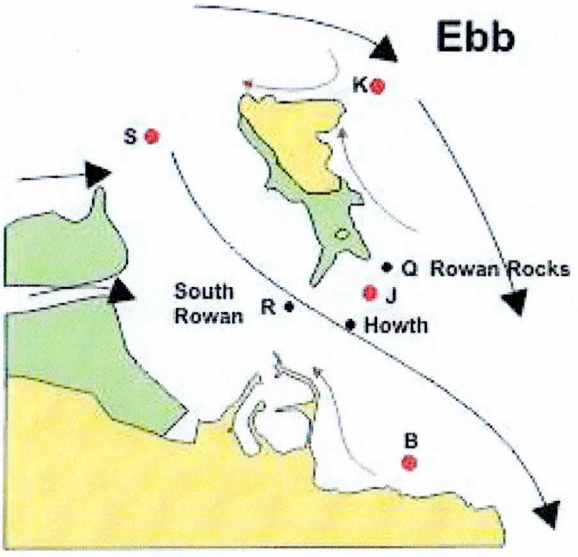


Figure 3.

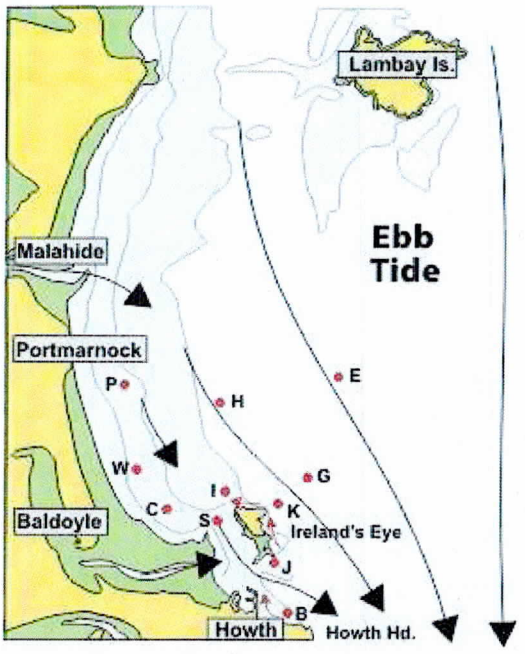


Figure 4.

B). Further In Combination Impacts as per Habitats Directive Article 6:

The EIAR and NIS fail to consider several in combination projects which will impact on the integrity of the many protected site in the area.

B1. Dublin Port Masterplan 2040. The master plan clearly states that due to sediments and contaminants escaping into the marine environment (dredging, emergency tank flushing of Cargo and passenger ferry's) that all 17 SAC/ SPA European sites would be affected, they clearly state that they cannot discount the adverse effects on the integrity of these sites and cannot suggest mitigation as despite the certainty of impacts no investigations have yet been enacted. Section 4.2.1 states the following:

"4.2.1 Water Quality and Habitat Deterioration The Screening for appropriate assessment report concluded that LSEs as a consequence of suspended sediments and/or contaminants escaping into the marine environment during marine engineering construction works could not be discounted for all 17 no European sites considered. All of the SACs considered in the screening assessment are hydrologically linked to the marine waters of Dublin Port where marine engineering construction works might occur. Some of those SACs are also designated SPAs for their intertidal wetlands. Other SPAs are designated for breeding seabird colonies which rely upon these marine waters to obtain their prey. As a hydrological pathway of effect exists, these risks cannot be discounted. ***It therefore follows that the risk of suspended sediments and / or contaminants escaping into the marine environment leading to a deterioration of wetland, marine and coastal habitats with respect to their water quality and favourable conservation status (which are listed as QIs or SCIs for European sites) cannot be discounted****. In assessing the risk at this second (appropriate assessment) stage, further evaluation and analysis must be undertaken to characterise the impacts that may occur, and to apply measures to avoid, prevent, reduce or, if possible, offset any identified significant adverse effects to determine whether or not Adverse Effects on the Integrity of a Site (AEIS) will* occur.

B2. Doldrum Bay outfall.

Although the Doldrum Bay outfall which historically released untreated sewage into the sea at Howth, has been diverted to Ringsend, in the event of a storm/ Rain surge this outfall can be opened and untreated effluent re-routed through it to the sea in order to take pressure off the Ringsend plant. In the event of a heavy rainfall event, this untreated sewage would add to the impact of the GDD outfalls untreated sewage on the European sites on the North Dublin Coast. This has not been acknowledged as an additional Impact.

C. Loss of Habitat:

The application does acknowledge that the construction of the two tunnelling compounds will result in direct loss of habitat, but states that as it is only temporary (18 plus months) that it will have no adverse effect on the protected species of birds that feed and roost on the site. I wish to point out that the life cycle of these species ranges from 3-7 years on average and that in terms of that life cycle 18 months to two years would be a significant portion of a protected bird species lifespan and would very certainly result in avoidance behaviour that would not be reversable.

D: Flooding:

The areas where it is proposed the compounds will be built are subject to flooding. The Flood prediction maps in the event of a 0.1% AEP and 0.5% AEP are illustrated in Figs. 5 (31) and 6 (38). The maps are taken from the document: Irish Coastal Protection Strategy Phase 3 – North East Coast- Strategic Assessment of Coastal Flooding and Erosion Extents.

In both cases the area where the compounds will be, would be subject to flooding during a storm surge during high tide. In this event the compound which are extensive in size would become flooded. The compound shown in fig 7. Is a few feet below the car park and has flooded as recently as October 2014. Bentonite, solvents and hydrocarbons will be stored in these compounds. In the event of flooding these compounds present a huge risk to Baldoyle SAC and SPA again contravening Article 6 of the Habitats Directive.

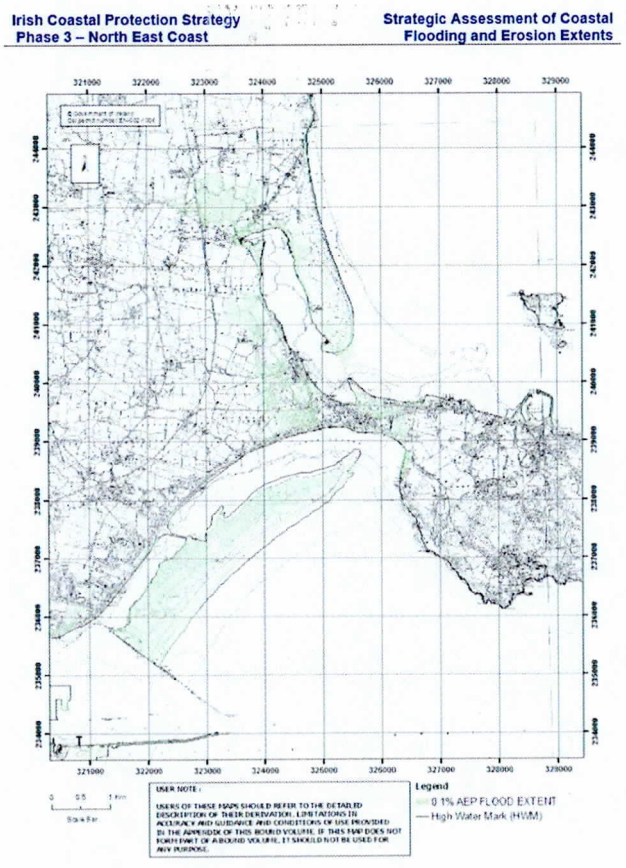


Figure 31: Portmarnock to Bull Island Predictive Flood Extent Map, 0.1% AEP

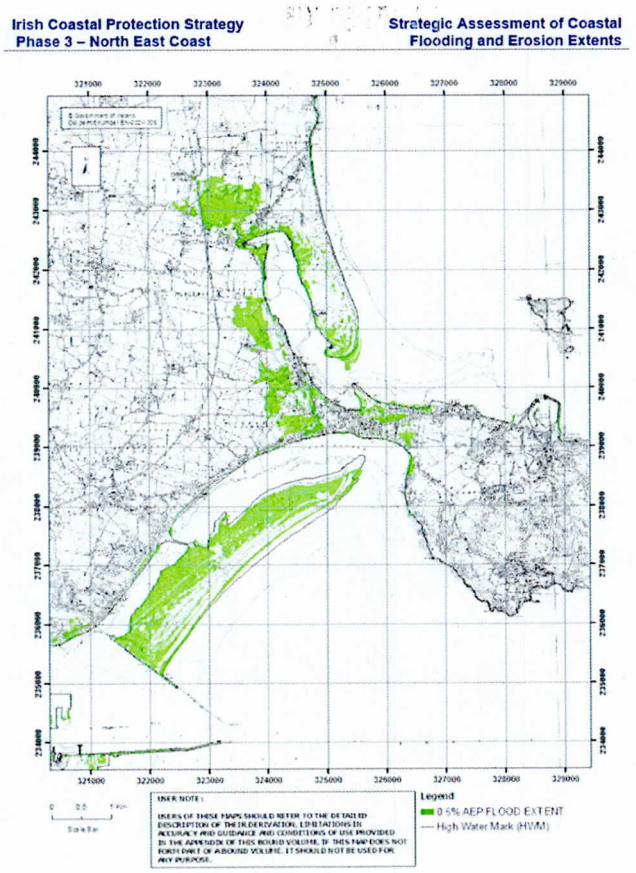


Figure 38: Portmarnock to Bull Island Predictive Flood Extent Map, 0.5% AEP

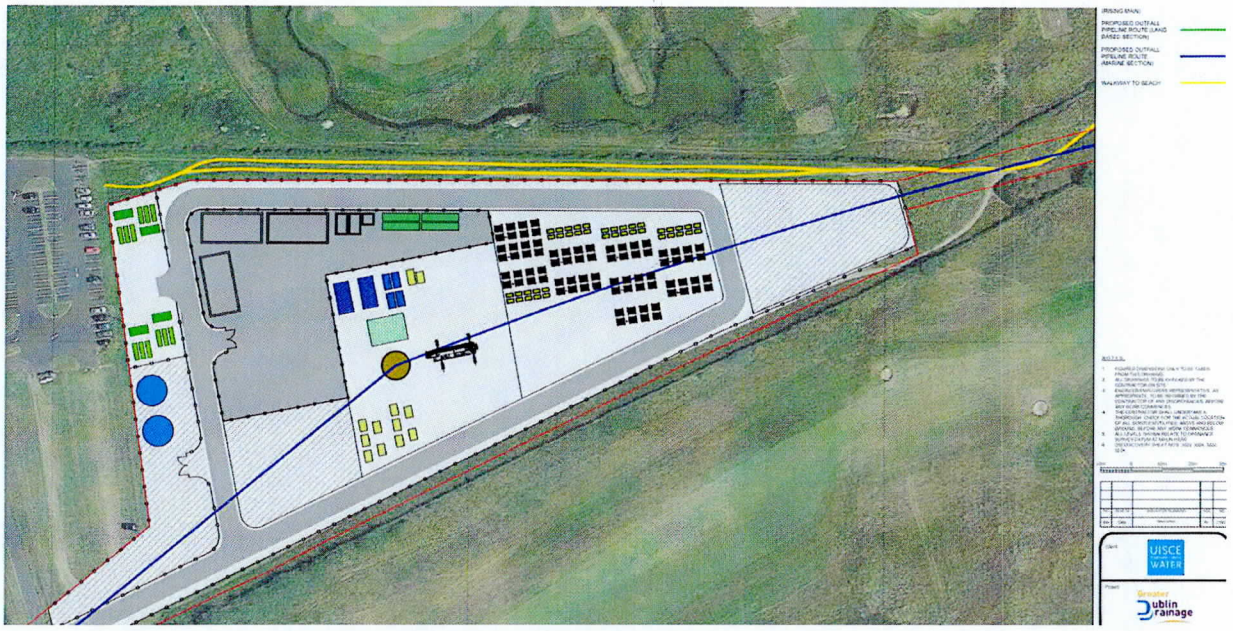


Figure 7. Construction compound resulting in direct Habitat Loss.

The Above points reiterate my previous submission by concluding that it contravenes articles 6.1, 6.2, and 6.3 of the Habitats direct and the 2011 Birds Directive.

Yours Sincerely

Sabrina Joyce-Kemper

Greater Dublin Drainage Project

SID Application

ABP Case file 312131

Appendix Reference:

1.4

Appendix Description:

Sabrina Joyce-Kemper submission 7th June 2024

1.4

An Bord Pleanala Oral Hearing

Case reference: PL06F.301908

Submission by

Sabrina Joyce-Kemper

Tuesday 26th March 2019

1. My name is Sabrina Joyce-Kemper. I am a Portmarnock local and founding member of ECHO (Environmental Conservation of Habitats Organisation) which is a voluntary organisation. I am a Consultant with 23 years expertise in EU Legislation in the areas of Customs, Trade, and Agriculture.

2. Today I will represent myself as a Portmarnock resident and I am also here representing residents in a number of communities in Clonshaugh, Baldoyle, Blanchardstown, Malahide, Howth and Kilshane.

3. In my submission today I will highlight flaws in the ASA assessment, and discuss impacts on protected sites and species that were not raised during the application process.

ASA Site Selection issues.

4. Throughout the Alternative Site Assessment Process there were flaws in the methodology that was used to screen out potential sites. One of the major concerns in both the ASA process and the current application is the belief, by the applicant, that the utilisation of trench-less tunnelling under Baldoyle Estuary constitutes an avoidance measure, resulting in no impacts to the SAC/ SPA at Baldoyle Bay. This was too broad an assumption at so early a stage in the selection process. It was also decided early on in table 4.2 of ASA2 that as Ireland's eye SAC was "designated of coastal and not marine habitats. There is no hydrological link and no open pathway of effect, thus no real possibility of LSE's" which I believe is incorrect and should be addressed.

5. This outlook of tunnelling under the SAC means no impact, led to a deficit of assessment for these two SAC's, which is apparent as early as stage two of the ASA process by virtue of the fact that in the **ASA Preliminary Screening Outcomes Report,** during ecological constraint mapping, Baldoyle SAC and Ireland's Eye SAC were consistently left off constraints maps and therefore left out of consideration when it came to analysing constraints. One such example is the ecological constraints map (figure 1). In addition, Baldoyle Estuary SAC SPA and Ireland's Eye SAC was also not identified on the **protected water bodies and areas at risk of flooding** map.

6. The methodology for the site selection stated that at an early stage, ecological constraints such as SAC's/ SPA's, Ramsar Sites, Nature Reserves, National Heritage areas (all of which apply to Baldoyle Estuary) would be screened out of the selection process. However this was only

applied to the land parcels and not the outfall sites. Land Parcels with outfalls traversing protected areas should have been screened out as per the methodology statement.

7. Due to the fact that only article 6.3 OR 6.4 of the Habitats directive can be invoked when dealing with Impacts on SAC's and their qualifying interests, it is important that un-assessed "mitigation measures" which negate all impacts on an SAC in one fell swoop are not relied upon to keep a site in play during the ASA process. This appears to have been the case in the site selection outcome for the Greater Dublin Drainage project. Applying all encompassing mitigation early in the process may have resulted in the three sites that were chosen as preferred sites not actually being the best three options in terms of having the least ecological constraints, due to adaptive mitigation strategies, which were not applied across the board but only to the sites that were partnered with the Southern Outfall. .

8. The comparison of the Ecological constraints of the Northern and Southern outfall routes was not balanced. The Study area for the Northern outfall was substantially bigger that the constricted area of the Southern outfall. The Northern outfall contained far more constraints by virtue of the fact that it was at least 6 times larger than the study area of the southern outfall. This imbalance directed the selection process to incorrectly find land parcels associated with the southern outfall as the least ecologically constrained as only four SAC's were identified in the near/ far field for the southern outfall as opposed to seven for the Northern outfall. (Figure 2)

9. COUNCIL DIRECTIVE 2008/114/EC deals with critical infrastructure and under Article 1(6) of this legislation *"The primary and ultimate responsibility for protecting European Critical Infrastructures (ECIs) falls on the Member States and the owners/operators of such infrastructures."* The legislation was enacted so that member states would identify and classify risks, threats and vulnerabilities to infrastructure assets. While planning constraint and development documents from 2012 do identify possible risks from aircraft accidents with Clonshaugh being in the public safety zone in relation to Dublin Airport, there is no assessment of deliberate terrorist threats either physical or cyber and the impact that such attacks may have for each of the potential sites.

10. The Clonshaugh site is under the flight path for Dublin airport and is adjacent to major motorway infrastructure. Of all the land parcels identified, it has the highest concentration of residential areas including its nearest neighbour, a 490 bed hotel. Each of the land parcels should have been assessed in terms of how they performed in worst case threat scenarios, in

terms of Natural Disaster, Cyber Attack and Terror threat. The ASA should also have examined how each site would interact with other such Critical Infrastructure in the event of a major incident. e.g. would an explosion or fire at Clonshaugh interfere with visibility in the skies and result in the grounding or diverting of aircraft at Dublin airport causing passenger and cargo delays? Would the proximity of population and the higher potential for mortality and injury put the Emergency services under pressure? In the case of a cyber attack would prolonged pumping of untreated effluent into the sea have a higher public health impact closer to Dublin city than in a more northern outfall point?

11. EU legislation requires the following cross cutting criteria to be assessed for all European Critical Infrastructure; The cross-cutting criteria are developed on the basis of the severity of the disruption or destruction of the Critical Infrastructure. The severity of the consequences of the disruption or destruction of a particular infrastructure should be assessed on the basis, where possible, of:

    a. Public effect (number of population affected);
    b. Economic effect (significance of economic loss and/or degradation of products or services);
    c. Environmental effect;
    d. Political effects;
    e. Psychological effects

    It would perhaps have been prudent to asses this at a point when it could be taken into consideration at ASA stage, rather than when the plant is already built in the most built up area in terms of population and infrastructure, compared to the other eight potential sites.

12. The issue of Environmental effect to be assessed under this Critical Infrastructure legislation is an interesting one. At no stage in the application is the issue of compensation in the event of a major environment disaster discussed, during the construction or operation phase. Directive 2004/35/EC of the European Parliament on environmental liability with regard to the prevention and remedying of environmental damage (ELD), establishes a framework based on the polluter pays principle, to prevent and remedy environmental damage. The polluter pays-principle is set out in the Treaty on the Functioning of the European Union (Article 191(2) TFEU). As the Environmental Liability Directive deals with the "pure ecological damage", it is based on the powers and duties of public authorities ("administrative approach") as distinct from a civil liability system for "traditional damage" (damage to property, economic loss, personal injury).

13. The Directive defines "environmental damage" as damage to protected species and natural habitats, damage to water and damage to soil. Operators carrying out dangerous activities listed in Annex III of the Directive fall under strict liability (no need to prove fault). Operators carrying out other occupational activities than those listed in Annex III are liable for fault-based damage to protected species or natural habitats. The establishment of a causal link between the activity and the damage is always required. Affected natural or legal persons and environmental NGOs have the right to request the competent authority to take remedial action if they deem it necessary.

14. In light of the recent discharge from Ringsend into the UNESCO biosphere it is highly likely that a discharge directly into the Rockabill SAC will occur, either due to overloading, mechanical failure or the normal operation of CSO (combined sewer overflows) or SWO's (Storm water overflows) in heavy rainfall. We will ensure that Irish Water are held legally and financially to account for any breaches of legislation that may occur, but have they accounted for the economic liability that pollution episodes will incur if this project goes ahead. This environmental liability risk will continue for the full operational period of the design horizon of the Waste Water Treatment Plant and beyond. As the State and therefore the Taxpayer is financially tied to Irish Water this liability needs to be risk assessed and quantified as an actual economic cost of going ahead with the project. It may not be financially viable for the project to be built at this site with so many environmentally sensitive sites adjacent to the outfall, and transited by the pipeline. Will Irish Water be able to secure Insurance to cover Environmental Liability on a Waste Water Treatment Plant of this size? Perhaps a risk assessor should be engaged to confirm the level of Environmental Liability risk for both build and operation of the plant and quantify potential costs to Irish Water or their insurance company.

15. If Insurance for Environmental Liability will not be covered by a third party insurer then an analysis of what Financial provision for environmental liability will be made between Irish Water and the EPA, should be presented as part of the application now, before any pollution incidents occur and so it can be made a condition of any planning application, that a bond for liability is in place before any construction begins.

Unassessed Impacts

16. The EIAR traffic assessment does not mention and therefore mitigate against, the danger to pedestrians and wildlife on the Golf links road approach to the construction compound 10 entrance. The road is extremely narrow with raised bank along part of the road; there is no pedestrian path on either side of the road. (Figure 3) It is an access road for one housing estate, at which point the majority of vehicles turn off the road. The remaining stretch of road gives access to the Golf club and a beach car park and has minimal traffic movements. Two cars can barely pass each other at some sections of the road. A HGV truck and car may have great difficulty doing so.

17. The turning circle required to access and egress the entrance to compound 10 with a HGV would not be accommodated by the current road layout and no alternative layout has been proposed or tracking of the turn diagrammed. The traffic movement chart (Figure 4) Shows the incredibly high number of car and HGV movements down this road. It is a local walking route and many pedestrians walk here in family groups, with children on scooters, and with their dogs. There is a very real risk of injury to walkers due to the high HGV movements and the valley effect with nowhere to step off the road safely to avoid construction traffic and loads. This road surface would also suffer from so many fully laden HGV vehicles carrying constructional materials and plant equipment onto the site.

Legislative context: *Under Section 191 subsection 1(e) of the Planning and Development Act 2000 it states a reason for refusal of permission on the following grounds: (e) any existing deficiency in the road network serving the area of the proposed development, including considerations of capacity, width, alignment, or the surface or structural condition of the pavement, which would render that network, or any part of it, unsuitable to carry the increased road traffic likely to result from the development,*

1.2 Under section 191 subsection 4 of the Planning and Development Act 2000 it states a reason for refusal of permission on the following grounds: "The proposed development would endanger public safety by reason of traffic hazard or obstruction of road users or otherwise."

18. There is also a high risk that walkers with their dogs who usually use the road to walk to the beach will be forced over the steep raised bank which acts as a natural shield, to the Estuary side which is within the SAC, thus creating unacceptable disturbance to the birdlife who feed and roost in this area. One of the highest negative impacts on this estuary is recognised as dogs. A study of disturbance of waterbirds in South Dublin Bay found that birds on the beaches (and coastal grassland) were largely habituated to people and their dogs moving predictably along paths and these activities caused very little disturbance (Phalan and Nairn 2007). Most of the 138 disturbance events recorded in 28 hours of observation were caused by dogs and people leaving the paths to go onto the beach or fields used by the birds. Dogs were implicated in 69% of all disturbance events observed and in 76% of events causing ten or more birds to take flight.

19. Table 4.1 of the Natura Impact Statement states the following: *Construction traffic associated with the micro tunnelling compounds will utilise existing roads (R106) and will therefore not result in displacement or disturbance to feature species of European sites.* The NIS does not refer to the Golf Links Road and the issue of no paths and construction traffic pushing dog walkers onto the Actual SAC. Therefore, Appropriate Assessment criterion has not been met.

Tunnel Boring Construction Phase.

20. The lack of detail around the Tunnel boring stage of construction is completely insufficient as is the assessment of Impacts of same in the NIS and EIAR. This type of construction is extremely hazardous and machinery breakdowns and accidents do occur. In 2013 a 26-year-old German technician was killed in the Corrib pipeline tunnel boring machine when a pipe carrying bentonite slurry buckled and disconnected striking him at the back of his head causing catastrophic fatal head injury. The Machine should have been stopped for intervention maintenance but was not. Just two months earlier the Minister for Natural resource Pat Rabitte released a statement to clarify issues surrounding shifting sediments during Tunnel Boring. He said **"***Corrib gas developers had notified his department about depressions in Sruwaddacon Bay, where the final section of the pipeline was being laid. These depressions "are caused by air escaping during tunnel boring machine 'intervention' maintenance".*

21. These actual occurrences are contrary to ascertains in the EIAR and NIS that such events are "highly unlikely". They are in fact very likely and any alteration to the mudflats and sediments that may be caused by depressions, may increase suspended sediments or changes to the

direction of the flow of the channel. This would absolutely significantly impact on Baldoyle SAC and the conservation objectives and targets including Conservation of the following community types in a natural condition: Fine sand dominated by Angulus tenuis community complex; and Estuarine sandy mud with Pygospio elegans and Tubificoides benedii community complex. The NIS is vague about the impact on sediments in relation to shifting substrates caused by regular maintenance on the Machine. The NIS states:

"The proposed Tunnel Boring Machine (TBM) to be used in the micro-tunnelling is expected to be 2m In diameter with a standard arrangement employed in the construction of this tunnel. As compressed air is used within the TBM to maintain an slight positive pressure, this can occasionally escape to the surface through trickle of air bubbles and create a small areas of surface sediment loss through liquefaction and winnowing of fines in prevailing marine currents. Whilst this does not have a chemical impact on the surrounding sediments, ***this can create a small area of physical impact to the SAC and qualifying interests of shallow sand and mudflats habitat (1140) in the form of a small pock mark or shallow crater. This may have a very localised impact on the sediments, particularly where they have limited cohesion (i.e. sands and silts making up the main part of the estuary)***. The statement goes on to say *"The pathway of possible discharges described above would be directly beneath these qualifying interests, but the permanent habitat area is stable or increasing, subject to natural processes and the natural condition will not be impacted by this unlikely event."*

The above statement used the same language "in the unlikely event" and "imperceptible" that was used in the Corrib Pipeline NIS and yet the events deemed unlikely did occur more than once and set a precedence for this type of tunnel boring project.

22. Neither the EIAR or EIS assesses the impact on Baldoyle Estuary SAC in the event of TBM failure that necessitates the use of an intervention pit, dug into the Estuary to retrieve or repair the cutting face of the machine or remove unforeseen obstacles if it encounters difficulties. Thus the appropriate assessment criterion has not been met.

23. The Trenchless tunnelling process being utilised by Irish Water should have been discussed in more detail, particularly in light of the fact that the launch and receiving construction compounds are on lands that contribute to the cohesion of the Baldoyle SAC protected site. Only one diagram of a compound is supplied as per (Figure 5) . This is indicative of the compound but has no identifying labels of features and is in 2D format. This basic drawing gives no indication of how the visual impact of the compounds will affect the local birdlife and sensitive receptors nearby. I have attached a diagram (Figure 6) for another project showing a 3D version of a compound for a somewhat larger project but the plant machinery required would be the same for this one. Some of the plant machinery and silos are quite tall and so have a very strong visual imprint that will do little to minimise the impact of. This plant machinery complete with lighting will be operational 24-7 .

24. Irish water does not provide a detailed description of the Slurry TBM methodology. There is no breakdown of below ground operations details, for example, summaries of soil excavation, tunnel lining, soil transport and separation, projected percentage slurry losses, handling of TBM obstructions and breakdowns, information regarding control of bentonite flow, controlling and monitoring of the excavation process, TBM guidance system, pipeline installation and reinstatement. There is no breakdown of above ground operations, slurry treatment plant processes and slurry treatment plant layout. As yet Irish water have not identified what machinery will be used above and below ground and are leaving these details to the contractor whom they are currently trying to engage via tender process.

25. At present Irish water are putting forward a slurry TBM as the machine that will be used for construction of the outfall. However, selection of the Tunnel Boring Machine (TBM) would depend on the Contactor's views on how to best to overcome the variable ground conditions and meet programme requirements. This could result in an alternative choice to that of the envisaged Slurry TBM method, it cannot be ruled out that an Earth Pressure Balance Tunnel Boring Machine or a multi-mode TBM may be selected by the expert contractor. As the TBM and slurry plant machinery choice is not definitive, It is impossible to accurately asses possible tunnelling issues or in the case of compound equipment, airborne noise impacts on the surrounding environment as the Decibel levels of the machines can not be conclusively addressed as being either within limits or in breach of acceptable levels particularly in accumulation with one another. They expect the diameter of the machine to be 2 metres but this is not confirmed it may be larger. As this detailed information is not contained in the current application Appropriate Assessment criterion has not been met.

26. Irish water does not have actual scientific information regarding the geology directly under Baldoyle Estuary where the Tunnel boring will actually take place. Borehole samples were taken each side of the estuary on dry land but none were taken within the estuary itself due to its strict protected status. The NIS states the following: "*The risk of a surface breakout by bentonite drilling fluid cannot be negated completely due to variability in the underlying geology. A detailed geophysical survey has been carried out along the proposed route in order to anticipate the risk of weak formations and possible faults that may increase the risk of a bentonite breakout. However, should the TBM encounter voids within the formation (such as a fissure or weathered area of rock), and then material can be forced to the surface under pressure to create a breakout. In the littoral and sub-littoral environments, the presence of bentonite at the surface can have a notable impact on sediment turbidity and suspended load. This increase in turbidity could result in increased siltation and the smothering of sediments and organisms accompanied by a reduction in the light available to the seabed for photosynthesis.*"

27. As Irish water and their eventual contractor are flying blind in terms of the actual geology under the Estuary itself there is a very real risk of bentonite breakout or substrate modification that would have a substantial negative impact on the qualifying interests of Baldoyle SAC namely Mudflats and sand flats not covered by seawater at low tide, Salicornia and other annuals colonizing mud and sand, Atlantic salt meadows (Glauco-Puccinellietalia maritimae), Mediterranean salt meadows (Juncetalia maritimi).

Legislative context: *According to settled case-law, the appropriate assessment of the implications for the site that must be carried out pursuant to Article 6(3) implies that all the aspects of the plan or project which can, either individually or in combination with other plans or projects, affect those objectives must be identified in the light of the best scientific knowledge in the field (see, to that effect, judgments in Commission v France, C-241/08, EU:C:2010:114, paragraph 69; Commission v Spain, C-404/09, EU:C:2011:768, paragraph 99, and Nomarchiaki Aftodioikisi Aitoloakarnanias and Others, C-43/10, EU:C:2012:560, paragraphs 112 and 113).*

i). The assessment carried out under Article 6(3) of the Habitats Directive may not have lacunae and must contain complete, precise and definitive findings and conclusions capable of removing all reasonable scientific doubt as to the effects of the works proposed on the protected site concerned (judgment in Briel and Others, C-521/12, EU:C:2014:330, point 27).

ii). In Peter Sweetman, Ireland, Attorney General, Minister for the Environment, Heritage and Local Government v An Bord Pleanála C-258/11, the correct application of the aforementioned provisions was summarised by the Court: "40. Authorisation for a plan or project, as referred to in Article 6(3) of the Habitats Directive, may therefore be given only on condition that the competent authorities - once all aspects of the plan or project have been identified which can, by themselves or in combination with other plans or projects, affect the conservation objectives of the site concerned, and in the light of the best scientific knowledge in the field - are certain that the plan or project will not have lasting adverse effects on the integrity of that site. That is so where no reasonable scientific doubt remains as to the absence of such effects (see, to this effect, Case C404/09 Commission v Spain, paragraph 99, and Solvay and Others, paragraph 67).

iii).Reliance on future mitigation measures in order to address any potential LSE is improper: a ***decision is unlawful if any reasonable scientific doubt exists at the time it is made****. In Commission v Portugal C-239/04 (at para. 24) the Court (again approving A. G. Kokott's Opinion) stated: "The fact that, after its completion, the project may not have produced such effects is immaterial to that assessment.* ***It is at the time of adoption of the decision authorising implementation of the project that there must be no reasonable scientific doubt remaining as to the absence of adverse effects on the integrity of the site in question*** *(see, to that effect, Case C-209/02 Commission v Austria [2004] ECR I1211, paragraphs 26 and 27, and Waddenvereniging and Vogelbeschermingsvereniging, paragraphs 56 and 59)."*

28. In relation to the Tunnel Boring process, Irish water is expecting the An Bord Pleanla Inspector and the Board to attempt to assess this stage of the project with little or no verified engineering information. If Irish Water were to go to their insurance company with such a lack of detail the underwriter would refuse to quote for insurance until further information was provided that would allow appropriate risk assessment of the project. An Board Pleanla are entitled to the same chance to appropriately asses this stage of the plan. As all aspects of the plan or project have not been identified due to a number of decisions regarding methodology of construction and plant equipment being he to eventual primary contractor and sub contractors, authorisation cannot be given as per conditions of the Habitats directive 6(3).

29. A major impact of the Tunnel boring process omitted from the NIS and EIAR which has not been assessed is the impact of the vibrations from the TBMs progress on foraging wetland birds. Some wading birds utilise Herbst corpuscles in their beaks to locate food sources cms under the sands/ sediment surface in wetland foraging sites. Godwit, curlew, snipe, redshank and knot utilise this feeding technique which may be affected by vibratory impact from the tunnel boring or piling process. Benthic pray being the food source of the SPA wading birds, are affected by vibrations caused by piling and tunnel boring in the estuary substrate. Such vibrational stimuli may lead to avoidance of areas within a distance of the piling in compounds or drilling under the estuary, further fragmenting the SAC by creating non benthic zones resulting in waders expending more energy looking for food. The fact that the TBM will run 24/7 means that when waders who exhibit site fidelity when foraging, are attempting to feed at low tide, depletion in foods sources with no recovery time for the benthos will result in additional energy expenditure for waders trying to find food, energy depletion due to less food sources available in expected areas which in turn can impact on breeding and general health.

Habitat Loss Site compounds 9 & 10.

30. In order to construct the trench-less outfall section of the pipeline, Irish water propose commandeering and developing a sizable area of grassland bird habit on each side of the Baldoyle Estuary SAC. This habitat will be hard landscaped into construction compounds for the duration of the project. Compound 9 will occupy a designated Ex Situ feeding site for Brent Geese and compound 10 will occupy a roosting and feeding site for a variety of birdlife reliant on the Baldoyle Estuary SPA. While we have an indicative layout for the receiving compound 10 there are no diagrams or drawing of the site layout or the Slurry Treatment layout for compound 9, which is to be built on a foraging site for Brent Geese.

31. Irish Water has tried to diminish the value of these sites in particular the Ex Situ feeding site at compound 9. These sites are interdependent with the SAC and have been for decades. On numerous NIS for nearby developments the areas around compound nine have been mapped as feeding sites for light bellied Brent Geese. Fingal County Councils Baldoyle to Portmarnock cycle route application identifies this area as a designated feeding site for light bellied Brent geese as does the Ecological Study of the Coastal Habitats in County Fingal Phase II – Birds (Figure 7), also commissioned by Fingal County Council. Another report (Figure 8) for Portmarnock south LAP NIS also commissioned by Fingal county council identifies the same

area as a feeding site for a number of qualifying species for the SPA. The Portmarnock Lap quotes: *Informal consultation was also undertaken with Irish Brent Goose Research Group regarding lands to the south of the LAP area (Baldoyle-Stapolin) and the Portmarnock South LAP lands. It was noted that the LAP lands used by Brent geese is dependent on whether, and where, winter cereals have been planted, with the geese being attracted to winter cereals. It was noted that this was not the case during the 2012/2013 winter, in the past large numbers (1000+) have been observed, particularly in the field which slopes up from the coast road within the east of the LAP lands.* (pers. comm., Resightings Co-ordinator, Irish Brent Goose Research Group, 2013).

32. The same report identifies main pressures and threats to light bellied Brent geese habitats as the following: *Habitat loss/degradation (human induced) – agriculture, infrastructural development, human settlement, tourism, recreation, dams, invasive species; accidental mortality – collision; persecution; pollution – global warming, sea level rise, water pollution; natural disasters – drought, storms, flooding; changes in native species dynamics – competitors, pathogens/parasites; poor regeneration, restricted range; human disturbance – recreation, transport, agricultural, industrial.*

    excluding dams and persecution every single one of those threats identified will be the reality if this development goes ahead.

33. The Portmarnock South Lap NIS same report also states: *Bird species of Baldoyle Bay SPA, in particular Light-bellied Brent Geese are known to use lands surrounding the SPA for feeding. A section of the agricultural lands adjoining the SPA, in the vicinity of C4 were noted to be of major importance with records of between 401-1450 Light bellied Brent Geese recorded from this area (Benson, 2009). Loss of feeding habitat may result in negative impacts upon qualifying interests of the SPA.*

34. Finally, the Portmarnock South Area Lap NIS concludes: *Once mitigation has been implemented in full, no decrease in favourable conservation status of Brent Geese are predicted and no significant impacts to Baldoyle SPA site integrity will arise as a result of loss of feeding habitat. This assessment has taken account of best available scientific information including a) current and historical Brent data for the fields in question, b) increasing national and local Brent Geese populations c) the species is not red-listed nationally, and d) taking account of mitigation measures including seasonal fencing and management measures of fields*

to the east and south of the LAP lands for wintering bird species including provision of a quiet zone.

35. It has been ascertained that there is a wealth of documented references to the area where compound 9 is planned for being an Ex Situ feeding site to not only Brent geese but qualifying species for other SAC's in Dublin. It is therefore integral to maintaining the favourable conservation status of Baldoyle Estuary SAC/ SPA in the first instance but also represents an important feeding site that contributes to maintaining a cohesive overall Natura 2000 network for the Dublin area.

36. The fields adjacent to Baldoyle Estuary SAC constitute part of the SAC habitat by virtue of their role as an extremely important terrestrial feeding site for Light-Bellied Brent Geese. Over a thousand geese have been documented feeding here at one time according to Fingal County Council commissioned reports, that constitutes approx 2.5% of the current population in Ireland and approx 8.5% of the Dublin area population according to birdwatch Ireland. The current climate of rapid development is an increasing threat to the existing suite of terrestrial foraging sites in Dublin. These sites are ex situ to the designated sites and must be considered critical to the maintenance of the Brent geese population and therefore these sites need to be protected by the legislation designed for this purpose.

37. The ex situ site that compound nine will replace is even more important in light of recent grants of planning permission for other ex situ sites despite their designation. One site is the Santa Sabina playing fields which have planning permission for 81 houses with a new application for 96 being considered. Two other sites with planning Erins isle GAA Finglas and Scoil Earcain Finglas will increase pressures on the remaining terrestrial feeding sites in Dublin.

38. The importance of the site is confirmed in the Wintering bird survey of the lands surrounding the Baldoyle Estuary December to February 2011 – 2012 which was commissioned as part of the South Portmarnock LAP. It states;

"This winter bird survey has demonstrated that the surrounding farmlands, amenity grasslands and golf club lands are important habitats for birds linked to the Baldoyle Estuary and should be viewed as being ecologically linked and not divorced from the estuarine areas. In times of hard weather, storms, high tides and low human disturbance times e.g. dawn/ night times birds frequently move from the estuarine areas onto the surrounding lands for additional feeding or

roosting needs. This valuable mix of land use together with the estuarine wetland habitats produces this diversity, if the mix stays as it is this level of diversity should continue.

39. The survey has found that the surrounding arable farmland in particular is an important feeding habitat for wader species from the estuary as well as winter finches, skylarks and buntings. The arable croplands location so close to the estuary allows this rich biodiversity to develop. If the surrounding arable lands are re-zoned then the diversity and numbers of the bird species that give the SPA status to the Baldoyle Estuary may be affected."

Legislative context: S.I. No. 477/2011 - European Communities (Birds and Natural Habitats) Regulations 2011. Part 4 section 27 (4) Public authorities, in the exercise of their functions, insofar as the requirements of the Birds Directive and the Habitats Directive are relevant to thosefunctions,shall

(a) take the appropriate steps to avoid, in candidate special protection areas, pollution and deterioration of habitats and any disturbances affecting the birds insofar as these would be significant in relation to the objectives of Article 4 of the Birds Directive,

(b) ***outside those areas,*** *strive to avoid pollution or deterioration of habitats, and steps to avoid, in European Sites, the deterioration of natural habitats and the habitats of species as well as disturbance of the species for which the areas have been designated in so far as such disturbance could be significant in relation to the objectives of the Habitats Directive.*

40. A recent An Bord Pleanla decision- Board Direction BD-001078-18 ABP-302225-18 for a planning application by Crakav Ltd. reinforces my assertion that this development cannot be granted permission due to direct habitat loss that would result from construction of compound nine and to a lesser extend compound 10. The decision reads as follows:

"*Having regard to the fact that the subject site is one of the most important exsitu feeding sites in Dublin for the Light-bellied Brent Goose, a bird species that is a qualifying interest for the North Bull Island SPA and having regard to the lack of adequate qualitative analysis and accordingly the lack of certainty that this species would successfully relocate to other potential inland feeding sites in the wider area, as proposed as mitigation for the development of the subject site in the submitted Natura impact statement, the Board cannot be satisfied, beyond reasonable scientific doubt, that the proposed development, either individually or in combination with other plans and projects, would not adversely affect the integrity of these European sites in view of the sites' conservation objectives."*

Mitigation versus compensation.

41. I wish to point out at this stage that I believe there is another important issue regarding compounds 9 & 10. The NIS and EIAR state that the impact of the two compounds is a temporary impact and that the compounds will be re-instated upon finalising of the outfall a year or two later. Fingal County Council also used the term reinstatement when looking for a written guarantee regarding the reinstatement of dune habitat at compound ten. The level of development impact at the compounds together with the length of time they will be utilised and the use of the word reinstatement, means that the act of reinstating or restoring the sites, is more a compensatory measure and not a mitigatory measure under the hierarchy of mitigation.

42. The legislation is clear. If the competent authority considers the mitigation measures are sufficient to avoid the adverse effects on site integrity identified in the appropriate assessment, they will become an integral part of the specification of the final plan or project or may be listed as a condition for project approval. If, however, there is still a residual adverse effect on the integrity of the site, even after the introduction of mitigation measures, then the plan or project cannot be approved (unless the conditions set out in Article 6(4) are fulfilled).

43. There are no mitigation measures for the compounds in that the land that they will occupy will be lost for a substantial and habit forming period of time and therefore will impact on the qualifying species and the integrity of the site. Particularly as the positioning of the compounds on a direct line on opposite sides of the SAC, will mean noise and light pollution from both sites, and heavy construction traffic 24-7. This constant disturbance will most certainly contribute to fragmentation of the SAC from the area south of the tunnel line to the area north of the tunnel line. **Habitat fragmentation** is defined as the process during which a large expanse of **habitat** is transformed into a number of smaller patches of smaller total area isolated from each other by a matrix of **habitats** unlike the original (Fahrig, 2003).

44. The very strong case for the restoration of the compounds being a compensatory measure means that in order for this project to go ahead it would need to fulfil the conditions laid out in article 6 (4) of the habitats directive. This project cannot fulfil these conditions as reference has been made in the application to the fact that the WWTP could have been built at any of the three preferred sites (and in light of the ASA flaws probably at some of the 6 that were screened out incorrectly) and so there are multiple possible alternatives to this site. I ask that the inspector raise this issue when submitting her report to the board and request that they seek legal clarification on same.

UV Treatment:

45. The lack of time to properly consider UV Treatment is concerning. While the Irish water team replied directly to some of the negative aspects raised, it was a knee jerk reaction report and just provided info on the bare minimum requested by Bette Browne. There is no comprehensive reference to other issues such as dark repair by organisms/ pathogens while the sewage is in the pipeline for 4 hours.

46. So this is an example of a situation where the goalposts have been changed at the last minute and Irish Water are expecting the Board to make a decision on UV treatment with no research into the kind of system that will be used and no validation or certification as to whether it will in fact be able to disinfect the effluent to the standard required by shellfish waters. They are suggesting a technology that they don't even know can be carried out on the kind of industrial and pharmaceutical heavy effluent that will be treated by this plant.

47. Other issues relating to water quality that have not been addressed sufficiently relate to the High percentage of industrial load that the plant will cater for. Inorganic substances will not be treated by UV treatment. Industrial load includes Leachate from landfill sites and waste water from heavy industry. Ringsends 2017 treated water quality tests indicated effluent content exceeded safe levels in a number of substances including Glyphosate a herbicide, Lead, Arsenic, Copper which are metals and drop to the seabed polluting the substrate in the immediate area, Chromium 6 we all know from Erin Brockovich fame as being cancerous, barium, Trichloromethane which the EU is currently taking Irish water to task over as its in our potable water as well . Finally Phenols and metaphynols which are known to be toxic and inflict both severe and long lasting effects on both humans and animals. They act as carcinogens and cause damage to the red blood cells and the liver, even at low concentrations. Interaction of these compounds with microorganisms, inorganic and other organic compounds in water can produce compounds or other moieties, which may be as toxic as the original phenolic compounds.

48. Anku et al 2017 – Phenolic compounds in water: sources, reactivity, toxicity and treatment methods state: *Phenolic compounds have been enlisted by the United States Environmental Protection Agency (USEPA) and the European Union (EU) as pollutants of priority concern. This enlistment is due to the fact that these chemicals are noted to be toxic and have severe short- and long-term effects on humans and animals [5]. The occurrence of phenolic compounds in the aquatic environment is therefore not only objectionable and undesirable but*

also poses a danger as far as human health and wildlife are concerned. As a result, a number of wastewater treatment techniques have been developed and used for the removal of phenolic compounds from industrial, domestic and municipal wastewaters prior to their disposal into water bodies so as to minimise the devastating effects of these chemicals on human and aquatic lives. Some of these techniques include extraction, polymerisation, electro-Fenton process, photocatalytic degradation and so on.

49. Can Irish water confirm to An Board Pleanala if any of these treatment techniques have been considered in the design of the Plant. In light of the ecological constraints in the area in particular the two designated bathing sites at Portmarnock beach some sort of risk assessment should be carried out on the level of inorganic substances such as phenols that can be expected in the discharged effluent.

50. Appropriate assessment is the cornerstone of environmental protection and law. This project has been in the pipeline for 14 years and in that time the core design is the same as it was in 2005. One giant Waste Water Treatment Plant an orbital pipeline and an outfall to Irish Coastal waters. In 14 years there has been no attempt to come up with a more environmentally sustainable, carbon neutral design, perhaps incorporating smaller localised plants with constructed wetlands to act as filtration systems, releasing high quality treated water into local aqua systems. The added bonus is that constructed wetlands create habitats instead of destroying them. Once again the only consideration is for the most obviously cost effective option. But what is the cost to our own habitat. We swim in these waters, we harvest food in these waters, we sail in these waters. They are our habitat as much as they are the qualifying species that they are protected under. When we hear about the destruction of the rainforest we donate to the rainforest alliance and WWF and decry the third world mentality, of these countries destroying disappearing habits. But what about our own backyard the one we live in, do our protected habitats not warrant the same concern as those on the other side of the world? We need to do better. Irish water need to do better.

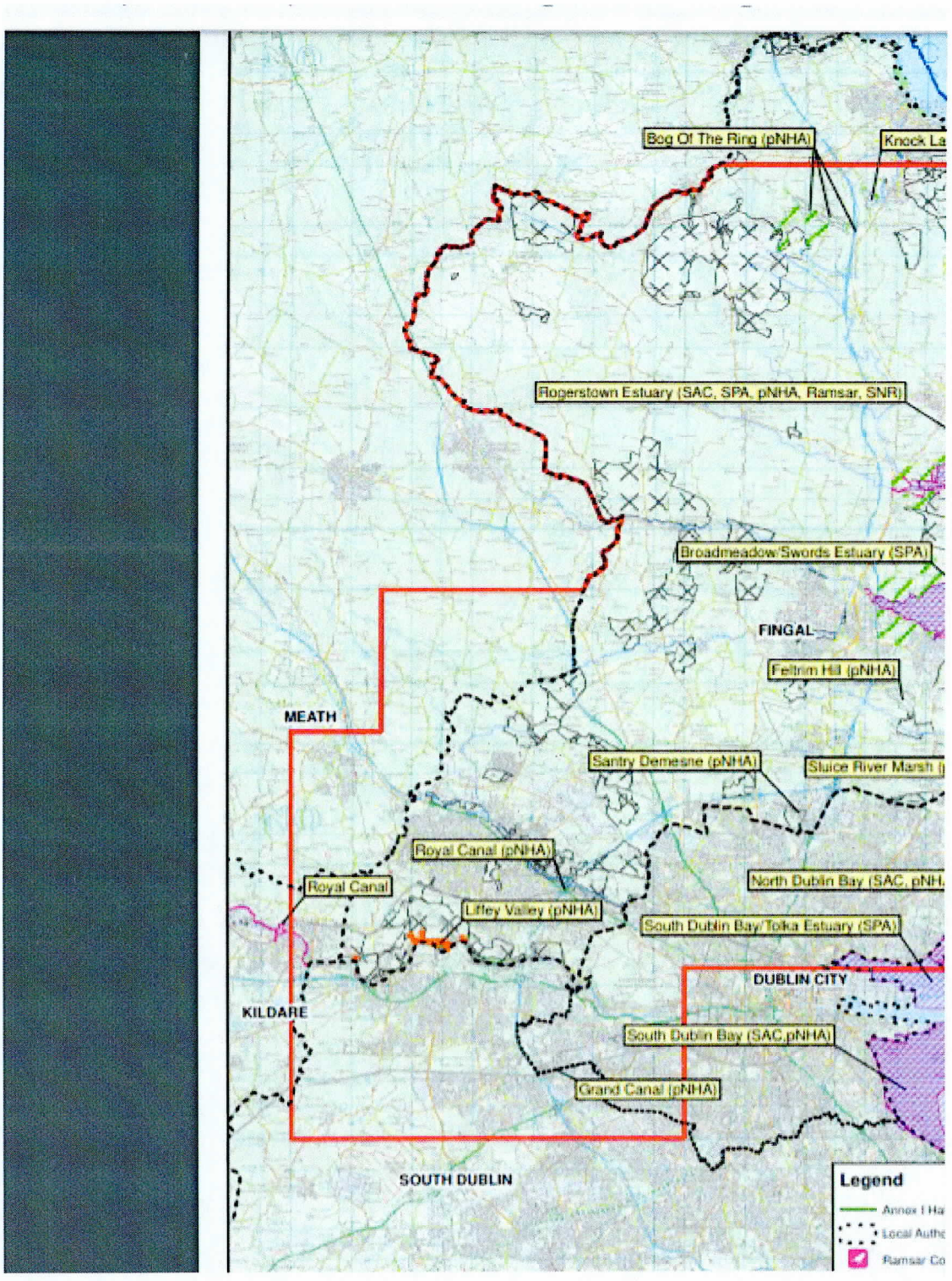


Figure 1: Phase two Ecological constraints Map – missing identifying Baldoyle Estuary SAC/ SPA and Irelands Eye SAC/ SPA

Table 5,6: Designated Coastal Sites in Fingal Relative locations

Design-ation	Code	Description	Qualif
		Northern Marine Outfall	
SPA, Ramsar & pNHA	4015	Rogerstown Estuary	
SPA & pNHA	4069	Lambay Island	
SPA	4122	Skerries Islands	
SPA & pNHA	4014	Rockabill	
pNHA	1215	Portraine Shore	Rocky bedroc
pNHA	205	Malahide Estuary	
pNHA	2000	Loughshinny Coast	Green-winged (*Schoenus*
pNHA	1218	Skerries Islands	
SAC	204	Lambay Island	123
SAC	208	Rogerstown Estuary	1130, 114
SAC	205	Malahide Estuary	1140,
		Southern Marine Outf	
SPA & Ramsar	199	Baldoyle Bay	
SPA	2193	Ireland's Eye	
SPA	4113	Howth Head Coast	
SPA	4006	North Bull Island	
SPA & Ramsar	4025	Broadmeadow/Swords estuary	

Figure 2: Phase two designated areas within both outfall study areas unbalanced methodology.

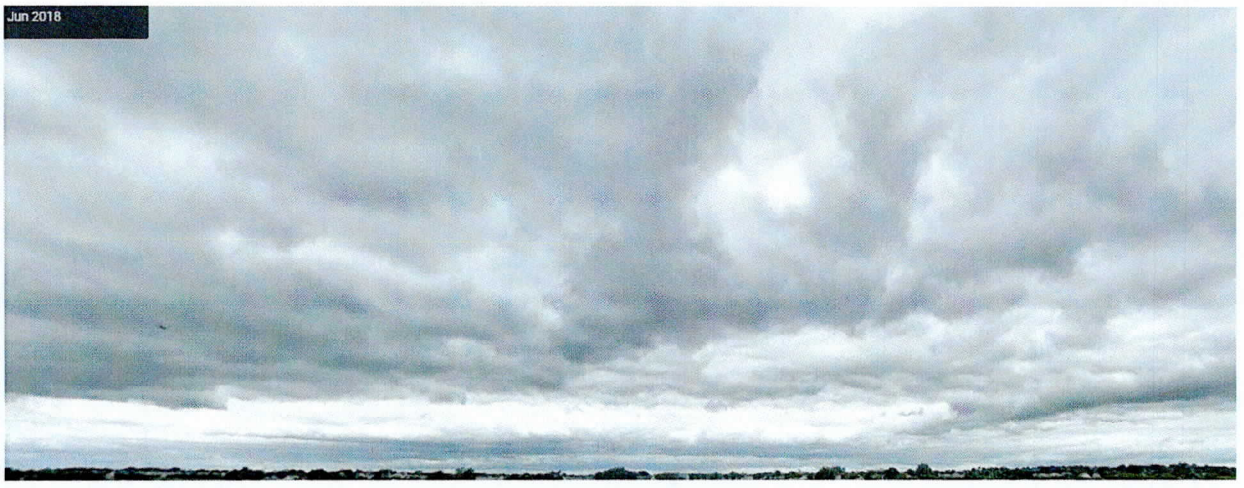


Figure 3: Google maps view of Golf Links Road Portmarnock. The road is narrow and unsuitable for HGV traffic. There is no footpath for walkers just a raised bank to protect the Estuary SAC from disturbance.

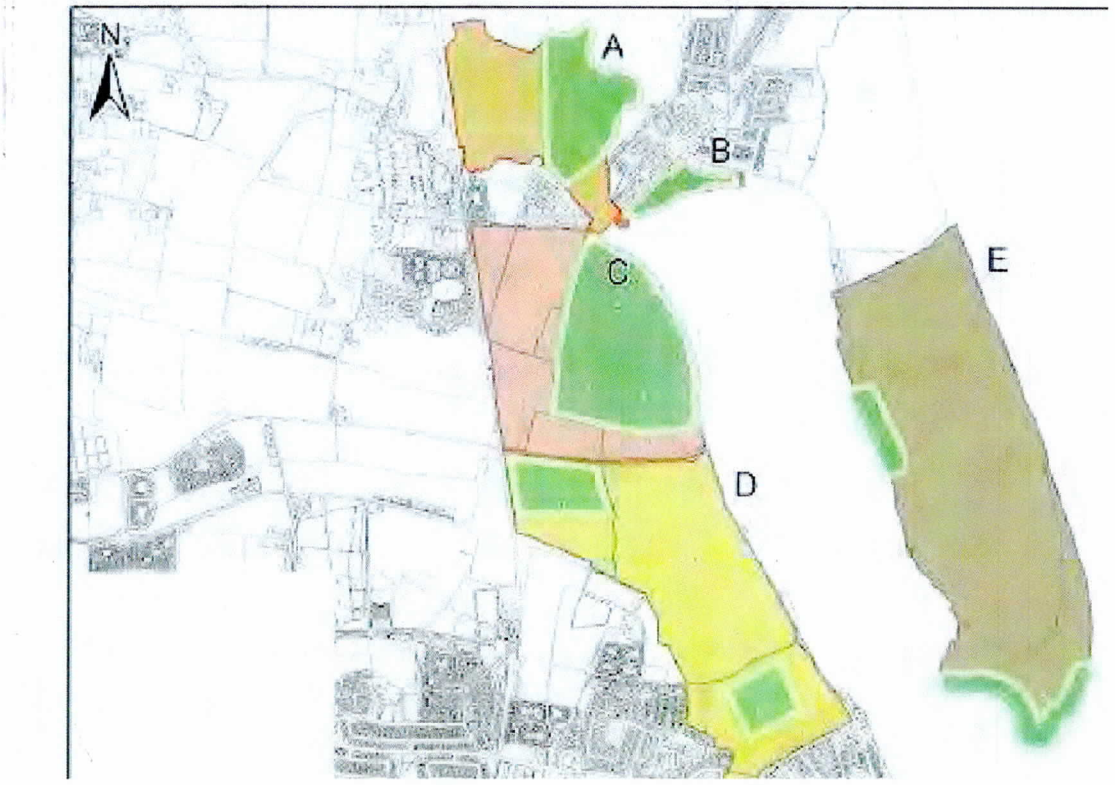


Figure 8: Birdwatch Ireland wintering birds study 2011/2012 for Portmarnock south LAP

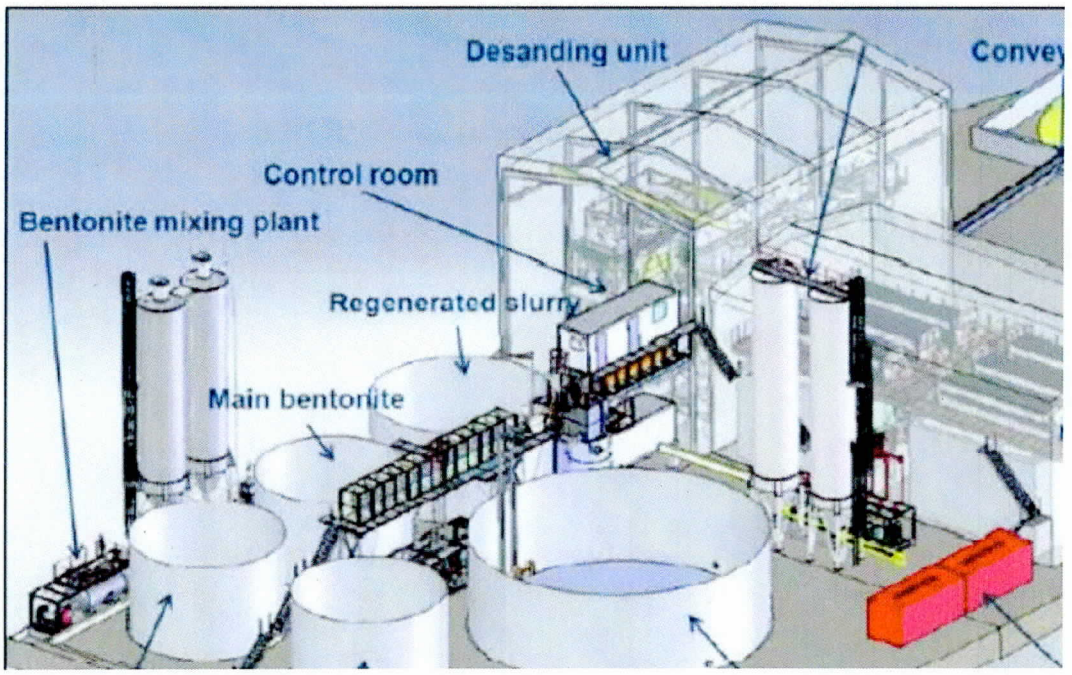


Figure 6: 3D diagram of a slurry treatment plant layout. No such diagrams or drawings of this plant machinery which will presumably go in compound 9 have been supplied.

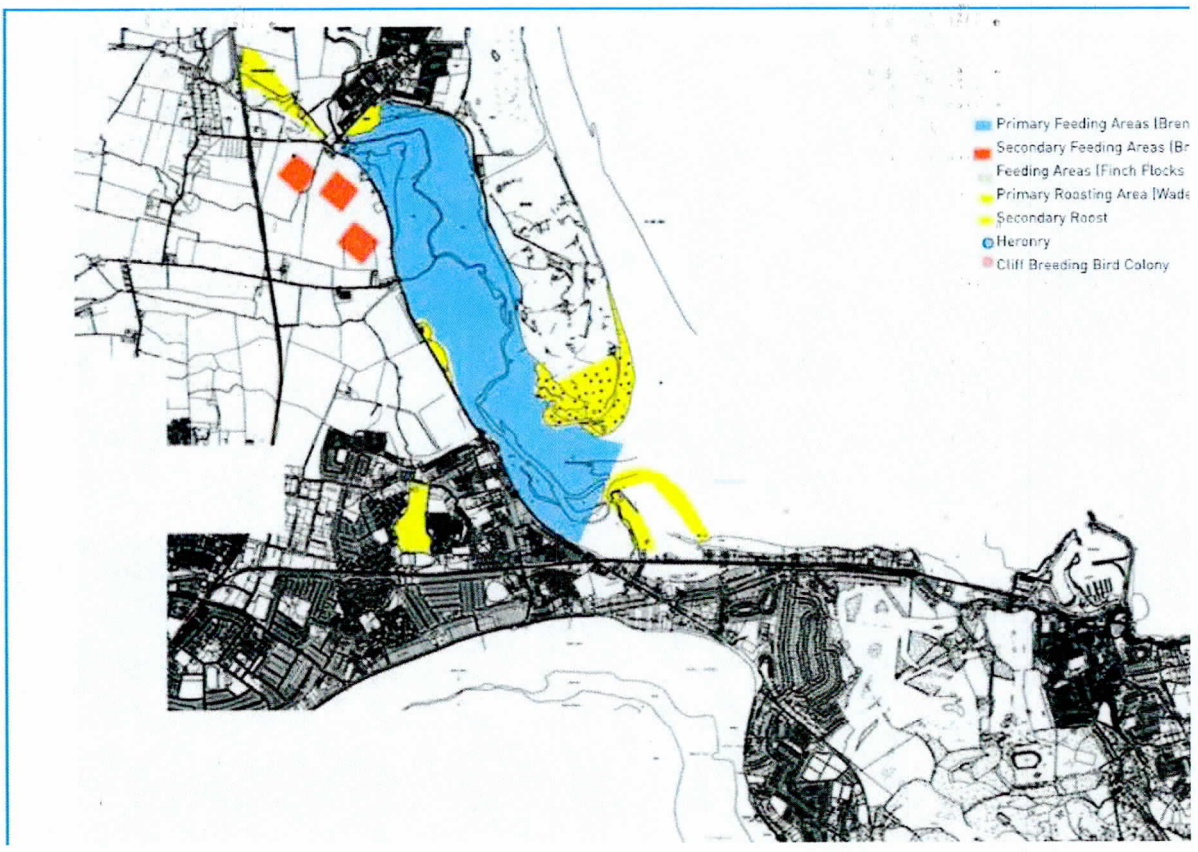


Figure 7: Ecological Study of the Coastal Habitats in County Fingal Phase II – Birds

Table 13.2: Trip Generation for the Proposed Project

Proposed Element of Proposed Project	Entire Construction Traffic (Two-Way Vehicle Movements)		Weekly Construction Traffic (Two-Way Vehicle Movements) for Phase 5	
	Cars	HGV	Cars	HGV
Proposed WwTP	341,000	54,301	2,750	438
Proposed NFS diversion sewer	3,300	1,952	330	196
Proposed outfall pipeline route (land based section)	33,000	19,261	330	193
Proposed orbital sewer from Abbotstown pumping station to proposed WwTP	25,410	34,614	330	450
Access shaft (section of proposed outfall pipeline route (marine section)	42,840	3,838	2,520	226
Tunnel (section of proposed outfall pipeline route (marine section)	36,960	2,313	840	53
Subsea (section of proposed outfall pipeline route (marine section)	29,040	1,049	330	12
Proposed Abbotstown pumping station	10,560	2,392	220	50

Figure 4: traffic counts relating to outfall construction. The road that access the compound 10 is not structurally able for this level of HGV traffic. See fig 3.

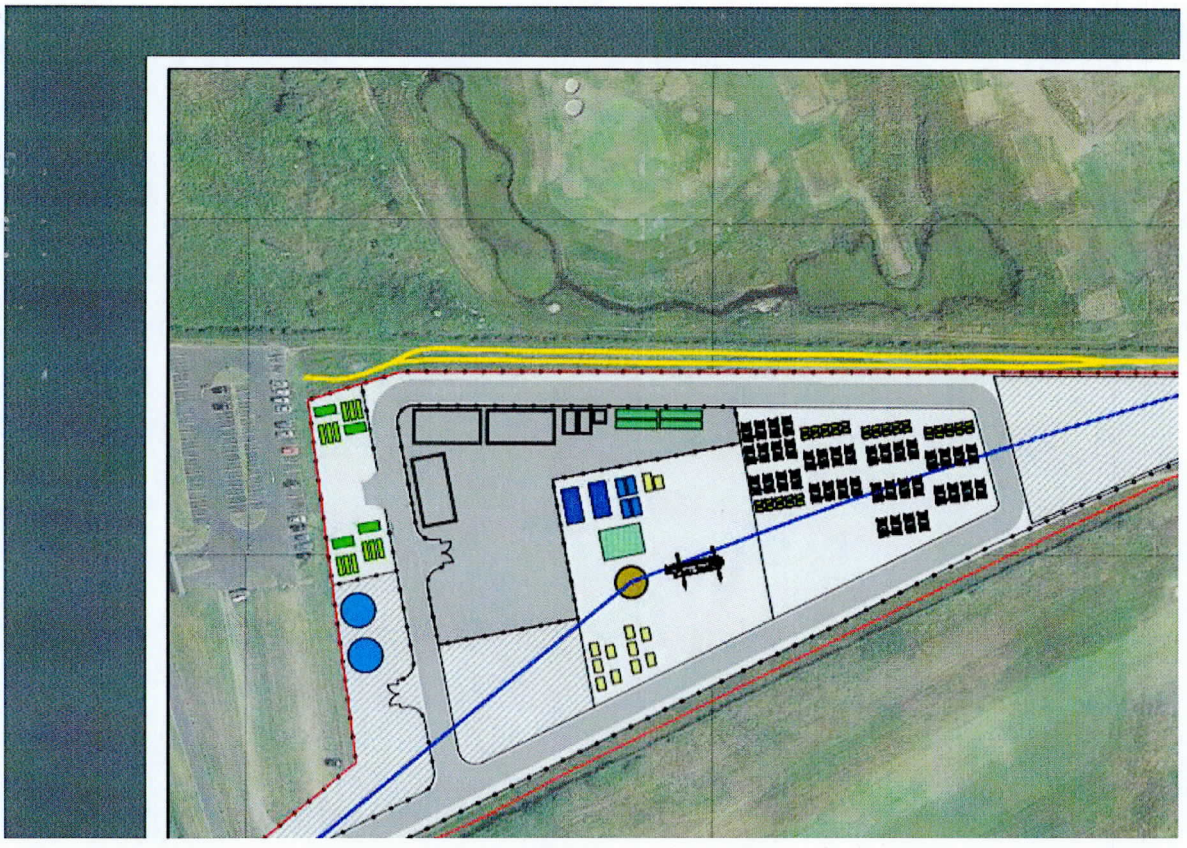


Figure 5: indicative arrangement of compound 10 provided with the application, note there is no description of the areas or items within the compound.

Greater Dublin Drainage Project

SID Application

ABP Case file 312131

Appendix Reference:

1.5

Appendix Description:

Sabrina Joyce-Kemper submission 7th June 2024

PLANNING SUBMISSION - 312131

Observer Name(s):	Sabrina Joyce-Kemper
Address:	C/O 23 Portmarnock Crescent, Portmarnock, Co. Dublin
Date:	29th September 2022
Planning Authority:	Fingal County Council (FCC)/ Dublin City Council (DCC)/ Kildare County Council (KCC)/ Meath County Council (MCC).
Planning Reference:	SID Development – ABP-312131-21 (reactivation of ABP-301908-18)
Development Description:	Greater Dublin Drainage Project consisting of a new wastewater treatment plant, sludge hub centre, orbital sewer, outfall pipeline and regional biosolids storage facility

Introduction.

I Sabrina Joyce-Kemper wish to reiterate my objection to this SID development application. I have taken an active role as observer on this application in its previous iteration (301908), making written observations and taking part in the oral hearing. I also judicially reviewed certain legislative issues with the previous ABP decision resulting in the quashing of the file and this remittal and reactivation of the application. Since the judicial review, I and my steering committee have continued our research into the development. We represent the public concerned in communities in Howth, Sutton, Baldoyle, Portmarnock, Malahide, Kinsealy, Balgriffin, Coolock, Clonshaugh, Baleskin, Sillogue, Kilshane and Blanchardstown. Via FOI and AIE requests with Irish Water and different Ministerial Departments and state bodies we have become aware of some concerning issues regarding this application that must be addressed.

While we could not afford to retain the services of experts for expert reports we have attempted to give as much technical detail as we can, and ask that the Board consult fully with prescribed bodies such as the EPA, HSA, HSE, Marine Institute, Inland Fisheries Ireland, NPWS, OPW, SFPA, BIM, ASCOBAN and MARA when it is established in relation to these issues. We also ask that if the Board does not have the expertise to assess the application that it retains the services of appropriate and independent experts in terms of Ecology, Environmental Law, Marine modelling etc. It is imperative when making any future decisions that the Board comply with the Habitats Directive, EIA Directive and all other legislation that calls legally for compliance.

In the intervening time I have attained a Diploma in Planning and Environmental Law from Kings Inn and have raised legal issues in this objection which I feel I can now claim to have some expertise in. I am also acutely aware that Minister Peter Burke and the Attorney General are overhauling the Planning Act and associated legislation with potential changes coming in December. In light of this I would raise the issue of additional public consultation if any of this legislation is enacted before the board make a decision on this SID reactivated case, in the interest of Justice.

I would like to thank the Board for allowing us the opportunity to make further submission on this reactivated case, it however as suggested by the Board in their letter a general submission" as solicited.

Once Irish Water and prescribed bodies have submitted updated information and the application is legally complaint with requirements to be up to date we hope to make another submission on the significant additional information submitted. We respectfully suggest that if the additional information required to make the application valid, is substantial, that it is submitted as new stand alone application so that there is now confusion between what was submitted in the past and what is actually applicable now. This will save the board having to specify details that make up the consent in any decision they may make.

1. Project History:

This project was born of the Greater Dublin Strategic Drainage Study (GDSDS) 2005, initially it was referred to as the Greater Dublin Drainage Scheme (GDDS) when it was managed by Fingal County Council (FCC) during years approx 2009 - 2014 and its current iteration the Greater Dublin Drainage Project (GDDP) which was taken over by Irish Water soon to be Uisce Éireann (UE) when the Water Services responsibilities of all Planning authorities were transferred to the State Utility which up until next year is a subsidiary of Ervia.

The Board must be cognisant of any legal implications of a name change and separation from ERVIA. The project began as an 720,000 – 850,000 population equivalent (PE) Waste water treatment plant (WWTP) , 3 Pumping stations (PS) and orbital sewer, and tunnelled outfall, which was reduced to a 750,000 Plant and finally to the 500,000 PE WWTP, 2 pumping stations a Sludge Hub Centre (SHC and Regional Biosolids Storage Facility (RSBF). The basic plan that was put forward in 2005 nearly twenty years ago of a single large WWTP, Orbital Sewer and pipeline has not changed much since 2005 despite serious advancements in Waste Water treatment technology and methodology.

2. Outdated application:

The application is now over 4 years out of date. Surveys, Cumulative impacts of new planning application that interact with this development and updated costs assessment must be provided. Irish Water have also applied to the CRU to use the moneys ring-fenced for the GDD project on other areas of Irish Water Expenditure due to an unprotected deficit in budget for RCU 3. As such the CRU has confirmed that the moneys have been reluctantly released. Therefore we must ask the question if the GDD no longer has the regulators clearance to invest capital expenditure in the GDD this revenue control cycle 2021-2024, how does Irish Water propose to progress the application, or development when it is no longer funded for expenditure on the project (consultants/ design/ surveys/ planning and legal fees etc). In light of this is this application premature?

2.1 Surveys:

The original application was lodged in June 2018. Over four years ago. Even at that stage many of the surveys were dated with a good portion being carried out during the years Fingal County Council were managing the project from 2009-2014. Some of the dye and drogue studies for instance date back to 2012/, nearly ten years ago. Many Surveys of flora and fauna were from 2015-2017. Attached at Appendix . Please find an advice note ***on the lifespan of ecological reports and surveys*** from the Chartered Institute of Ecology and Environmental Management (CIEEM). The advice clearly states that reports over three years cannot be relied upon and gives examples of what time frames are acceptable and why Ecological reports may become outdated and why they must be recent to be relevant. As such in order for the application to legally comply with the EIA Directive and Habitats Directive all surveys and reports must be brought up to date.

2.2 Legislation:

A great deal has happened on the legislative landscape both Nationally, at EU Level and Internationally.
The original application did not include assessments under legislation such as the Environmental Liability Directive, and new EIA transcriptions to include the EIA portal requirements and details of experts listed in EIAR etc. Guidelines in EIA for An Bord Pleanála Aug 2018 from Department of Housing state the Requirement that the EIAR must be prepared by competent experts and for the competent authority to have, or have access to, sufficient expertise to examine the EIAR. An EIAR must include a list of the experts who have contributed to its preparation, identifying, for each expert, the part or parts of the report for which he or she is responsible/has contributed to, his or her competence and experience, including qualifications where relevant, and any other information demonstrating the contributor's competence. The list of experts need to be submitted.

It is also apparent that a dredging licence and dumping at sea licence consent are required, as the excavated substrate will not all fit back in the tranche and so must be appropriate disposed of. There may be dual assessment element here.

There is also a substantial amount of new legislation that may not have transitional arrangements for a remitted file such as the new Foreshore regulations. The GDD was not listed as a specified project that could be fast tracked and legally it is unclear if the Foreshore element must now be carried out by ABP or wait for the setting up of MARA the new maritime agency. The Foreshore application for this GDD Project is currently on hold and had not yet gone out to public consultation. There are elements of a foreshore licence that would not be generally assessed in normal planning appeal such as impediments to navigation, soil liqufaction, full hydro morphology surveys and modelling, marine traffic,

All legislation that has been enacted or updated since June 2018 that relates to this planning file must be included and assessed against compliance of this development in an updated application.

2.3 Cumulative impacts:

All planning applications since the GDD application was made, or amendments to earlier identified planning consents that interact with project route need to be listed and assessed for cumulative impacts or for additional constraints to the GDD Project application and CPO. For example the Hole in the wall upgrade in Portmarnock / Baldoyle has been completed but now blocks the original access route to one of the GDD project compounds. Heavy machinery would now also have to cross a pedestrian and cycleway to access the site. It appears that part of the proposed Compound has actually been used for this development. So the CPO may no longer be valid and drawings may have to be reconfigured.

There are a number of new planning applications in the immediate vicinity of the WWTP including:
- New Data centres,
- Eirgrid cable crossings,
Statkraft Electricity infrastructure,

- Belcamp SHD,
- New Airport Runway,
- Huntstown Power Gas station,
- New Hotels (holiday Inn)
- New Petrol Station Clonshaugh Road
- Airport Fuel pipeline
- Wastewater infrastructural work with DAA
- Change to night flight conditions at Dublin airport,
- widening of rail line at Maynetown as part of the Dart Expansion
- New residential developments such as Portmarnock South Phase 1D etc.,

Then at the outfall examples such as:
-Copenhagen Energy/ Sunrise wind farm cable connector,
- Howth Pier redevelopment
- Howth Harbour dredging application
- Dublin Array Wind Farm.
- Dublin Port Dredging and Dumping at sea licences.

Also Brexit and the issues surrounding waste water discharge legislation and regulation in the UK which are resulting in devastating raw sewage discharges to the Irish sea from UK waste water treatment plants must be assessed.

Cumulative impacts need to be assessed on all such planning applications and projects that now interact with the GDD route.

2.4 Paucity of Data in application to date

We have identified a number of issues with the efficacy of some of the surveys that have been carried out in the application in particular in relation to for example the Dye and drogue surveys which we have listed these issues in Appendix .

Sediment transport and geomorphological assessment.

An issue we believe was never adequately assessed was sediment build up, and erosion/ scour impacts from the dredging/ trenching of the outfall for nearly 6 km from the shore. The sediment modelling was only based on an average trenching depth of 5 metres when at the interface the trench may need to be 11 metres deep.

There are protected reefs less than 1 km from the outfall route and the interface location of the dredging starts just 100 or so metres from a special area of conservation for sediment benthic species. The modelling took account of sediment in the water column but not where it would deposit. They also only modelled for a single port diffuser when the actual development is for a multiport diffuser over 100 metres at the end of the pipeline.

We believe additional modelling should include bedload transits and destinations, water column suspended sediments can go anywhere as they are dispersed and the modelling to be valid should include the exact type of outfall configuration. As the dredging and trenching will take place at the mouth of an estuary precise sediment modelling is paramount.

Although hydrodynamic modelling was carried the results were not fully calibrated although no explanation is given why. The modelling CORMEX and MIKE 2 did not appear to include wave action and were modelled during summer conditions only; they also took place in one case nearly a decade before the planning application between 2010 -2015. In winter our beach can empty of sand right down to the bare underlying rock and then after a storm the whole seabed will deposit up on the strand again as you can see by the sand levels.

It is our contention that wave impacts will be important, depending on the depth of the outfall, but more importantly about where the sediment will end up within the bay, modelling should include at least a year and include winter effects, the data run as it stands is totally inadequate Further, that this is data that is 10yrs old is also a grave concern as wave activity and extremes are on the increase due to climate change, as is sea level rise (now increasing faster so that waves will impact at a higher level on the intertidal). The sea level rise issue is relevant to the outfall location. In the Bathymetry map of the area there can be seen a natural underground trench locally called the long hole that causes a very unpredictable tidal gyre like movement that re circulates waters between Ireland's eye and Portmarnock. It is an interesting coastal area and has proven sediment issues, with Howth Harbour requiring urgent dredging works in the next year or two due to elevated siltation. The channel in and out of the Baldoyle Estuary (a special conservation area) is also interesting and has changed direction of the last few centuries (originally it was a navigable channel which hugged the coastline, before sediments built up and altered the direction. You can view different maps of the coastline at: http://geohive.maps.arcgis.com/apps/webappviewer/index.html?id=9def898f708b47f19a8d8b7088a100c4

Nearshore tidal gyres (bu Irelands Eye) will alter with sea level rise and so we must be clear of what assessment of the effect of changing sea level over the life of this development has been undertaken, is it future proofed against sea level rises and associated impacts for the next 30 years? A report tracking maps (GIS) of changes that have occurred in the positions of MHWS and MLWS since 1890s to date and the vegetation edge and those expected in the future, to if erosion patterns are to be identified. This data should be combined with potential scour and soil liquefaction from the operational phase of the development to try and assess if the outfall pipe could contribute to a loss of sediment via scour leading to erosion or if it could cause a build-up of sedimentation leading to changes in the current topography of the seabed north or south of the pipeline.

It is also imperative that a full hydromorphological/ geomorphological survey of the area is carried out to inform accurate models. It is also a requirement for legal assessment of a water body under the Water Framework Directive. Our Portmarnock Community Association have scientists on the committee and for a number of years they have been monitoring and recording and levels on the beach. It is our belief that the dredging and pipe line will result in geomorphic effects on the highly protected estuary (SAC/ SPA/ RAMSAR pNHA) area in terms scour and deposition which may cause sediment built up on one side of the trench and scour that will erode into the protected and rare dune peninsula on the other. For this reason we reiterate that a geomorphological study of Portmarnock to Howh coast should be carried out.

Evidence of such potential of such an occurrence can be found at Sutton Creek which was drastically modified after the Sutton to Ringsend subsea pipeline was constructed. As per Appendix . the channel

was so changed that Sutton dingey club were forced to change their launch location. Such a channel change at the mouth to Baldoyle estuary could have serious implications for the SACs and Portmarnock Spit NHA and must be assessed.

Design drawings. At present in our opinion, this application should be considered an outline permission. Nearly all drawings are indicative, the are no subsurface engineering drawings for the WWTP and Pumping Stations. There are three possible WWTP processes but only one has been subject to assessment with no proof of whether the process is a worst case assessment. Essentially the whole project is being left over to a detailed design at a post consent stage which does not constitute a design envelope and is contrary to the EIA and Habitats Directive, calling for precise and definitive information.

2.5 Alternative Site Assessment (ASA).

The initial ASA process took place when the site required for the WWTP had to accommodate a 750,000 PE Plant 3 pumping stations (with an option to utilise the Grange tanks, build a Grange pumping station at Stapolin/ Baldoyle and have the possibility to reverse the flow from Ringsend via Sutton pumping station to bring effluent from Ringsend to the GDD plant. There was a suggestion to tunnel a pipeline from Sutton Pumping station to the proposed GDDS Grange PS to take flows from Sutton Pumping Station and the North Dublin Drainage Scheme (NDDS) catchment pipe but the project team identified Baldoyle Bay SAC as being ***too sensitive a site*** to tunnel under, so that option appeared to have been rejected on that basis.

See section 8.4 of the Assessment of Domestic and non Domestic load on proposed regional WwTP appendix A3.1 GDD EIAR Vol 2 part B of 6 which states:

Diversion of this (NDDS) Catchment is dependent on the diversion of the entire NFS (North Fringe Sewer) catchment as it is not considered feasible of divert the NDDS sewer until the NFS catchment (including Portmarnock and Baldoyle) is diverted for the following reason.

"a new pipe would have to be constructed from Sutton pumping station to the new Regional WwTP. Routing of this pipeline would be difficult as a land based route is not available and a sea route would take take the pipe under the dart rail line and through the environmentally sensitive Baldoyle Estuary"

We have concerns that the chosen site will not be acheivebale due to constarins imposed by the new Fingal Development Plan.

Dalata Submission

The Inspector makes reference to the Dalata submission in her report but mentions all issues raised BAR the issue of revisiting the ASA process for the development in its amended form. Happily the Irish Water Response to to submissions goes into detail on the Dalata Submission. Dalata hotel group via Coakley O'Neill Town Planning, raised the issue in their original submission (page 5) very clearly:

"the second point to make here is that the site selection is based on a process that began, after the SEA, in 2011 and concluded in 2013. The applicant advises that:

A review of the ASA reports carried out by the project team in 2017 found that the assumptions and data supporting the ASA findings and recommendations have not changed significantly in the intervening years and concluded that the proposed site at Clonshaugh remained the 'most favourable' site for the proposed WwTP"

Therefore no new site selection assessment was undertaken for the proposed development. The approach consists of a re-evaluation on the initial site selection process carried out between 2011-2013. Since then, a new Development Plan has been adopted and several planning permissions have been granted in the immediate area for the new commercial and residential uses. Our view is that the nature and character of the area has changed to such a degree that it is reasonable to require that a more detailed evaluation of the changes should have formed part of the applicants study of alternative sites.

The Delata submission continues:
On this basis we submit that that there is significant information deficit in relation to site selection and consideration of alternative sites and an absence of a more up to date robust evaluation in that regard.
With the final Final Paragraph stating: *In conclusion while the need for the proposed greater Dublin Drainage project is acknowledged we submit that the proposed Regional Wastewater Treatment Plant and Sludge Hub Centre at Clonshaugh are not in accordance with the proper planning and sustainable development of the immediate area for reasons that they*

In their reply to the Dalata submission Irish water in their response to submissions January 2019 summarise the Dalata submission as follows at section 80 :
80. The Dalata submission considers that no new site selection assessment was undertaken for the Proposed Project, and that the approach consists of re-evaluation of the initial site selection process (carried out between 2011-2013). The submission suggests that the nature and character of the area has changed to such a degree since original site selection assessment, that it is reasonable to require that a more detailed evaluation of the changes should have formed part of the study of alternative sites. In this regard, it is stated that there is a significant information deficit in relation to site selection and consideration of alternative sites.

At section 17 and 212: IW stated in their response:
A review of the ASA/Route Selection Report was undertaken by the Project team in December 2017. The purpose of this review was to examine each element of the Proposed Project against the findings of each Phase of the ASA/Route Selection in light of the development of the Proposed Project since the final ASA/Route Selection Report was published in 2013 to assess whether the recommendations of the ASA/Route Selection Report remained valid. This review concluded that the methodology, findings and recommendations of the ASA/Route Selection process remain valid.

Therefore the DEVELOPER did consider the new version of the plant 500,000 in the context of alternatives in December 2017 in the response to submissions. In fact they rely on the review to reply to observers who raise the issue of the previous ASA process not being relevant to this application (which includes a 500,000PE plant). They just failed to give a detailed evaluation or written copy of their review that could be scrutinised by The Inspector/ Board and the Public. As this information in the form of observations and the above reply was before the inspector and the board they should have had regard to the issue and requested

further details of the evaluation of alternatives by the developer in light of the current application. It can therefore be proven that the developer studied the alternative but did not provide any information on these feasible alternatives that he considered.

3. Marja Aberson Advice

In his brief of evidence at the oral hearing , Ciaran O'Keefe announced that UV treatment would be applied. He stated; *"Subsequent to the Response and having regard to the submissions made by Fingal County Council and members of the public including fishermen, Irish Water asked us to carry out some further analysis, which my colleague Marja Aberson, who is a marine ecologist specialising in shellfish, completed. Her advice was to the effect that as an abundance of caution to ensure the protection of the shellfish,* ***additional treatment should be applied to the effluent****. Irish Water has determined that it will apply UV treatment to all effluent discharges.* ***The utilisation of UV treatment does not require any additional structures or changes to planned structures."*** however no report containing the summary of advice from Ms Aberson nor the data it was based on was submitted to inspector or the application.

We obtained a copy of the Dr. Aberson's summary of advice (See appendix) in a report which was not compiled until June 2019 in or about the time we requested a copy of her evidence from Dan at the GDD application team. When we received a copy of the report from the GDD, we established that nowhere in that summary of advice does Dr. Aberson suggest that additional treatment should be applied to the effluent. In fact, the complete absence of any recommendation by Dr. Aberson of a treatment that could ensure safe levels of E.coli was indicative that there was no additional treatment that could be recommended. She also indicated that a safe level of E.coli for razor clam (the closest shellfish species area to the outfall) could not be determined due to lack of data.

What Dr Aberson actually did appear say in paragraphs 15 and 16 of her report was: *"15. A review by Cefas (2014) has attempted to assess the evidence for potential use of indicator species to classify shellfish production areas. It was concluded that the mussel Mytilus spp. may be used as an indicator in many situations, but an indicator approach may not be recommended at this stage for representation of Ensis spp. due to no supporting data available.****Due to the paucity of data, it will be imprudent to estimate a potential accumulation factor in the tissues of razor clams as current work has shown a wide range of uptake rates and maximum concentrations between bivalve species, and with spatial-temporal differences also expected****."*

"16. In consideration of the proximity of the proposed outfall pipe from the Proposed Project to the receiving shellfish waters, the current classification of A and the scarcity of data on Ensis spp., ***a precautionary principle should be applied for assessing the risk to the Malahide razor clam fishery.*** *It is therefore recommended that Irish Water should seek to meet the Cefas indicative threshold value for 'all species throughout the shellfishery (Table 3, Appendix 2)."*

Based on Dr. Abersons actual verbatim report it would appear that the material facts of the issues relating to potential ecoli contamination of shellfish and the implications of UV treatment and its efficacy at this stage were not presented in full to the Inspector and therefore the Board. The Applicants by appearing to present their own solution (UV Treatment) as Dr. Abersons and by failing to raise issues relating to safe levels of ecoli in Razor Clams, did not give the inspector and and Board Pleanála the opportunity for robust assessment.

We decided to request further information via FOI/AIE on the data that supported the Marja Aberson report. The information we received back is greatly concerning. The information contained a number of

email correspondence (Appendix)in relation to what Ms Aberson had advised and how it was to be presented to the oral hearing. She repeatedly suggested that she was not comfortable putting forward a definitive expert opinion as the paucity of data available would not support an opinion either way. It also transpite that she was presnt in the Hotal at the oral hearing but was not presented to give her own evidence which was submitted by Ciaran O'Keefe instead as part of his evidence. It is our understanduing that an Inspector can only accept evidence from an expert if they themselves read it into the record. As such the reliance on that section of Mr O'Keefes evidence may not be legally sound.

Contained in the FOI was also some correspondence and reports which relate to the modelling on ecoli levels and uptake in Oysters/ mussel and "all species" which is the category that Ms Arbeson suggested the Razor Clam must fall into. The modelling was carried out on the Malahide Shellfish monitoring point just at the mouth of Malahide estuary. However more importantly and contrary to all other modelling presented with this application, which we believe just referenced and gave impacts at this this monitoring point, this report (which was not presented to the board despite being available some days before the oral hearing and requiring legal advice from ALG) modelled monitoring points of the Designated shellfish areas closet to the outfall discharge point. The results as Alan berry states to Ciaran O'Keefe in his email are ***"not good".*** The modelling shows breaches of save levels of ecoli in the razor clam that would impact the class of the shellfish area and commercial fishing and export market to China of Razor clams. The reasons for not submitting this information (unless we missed it) and the obvious requirement that all modelling now take account of the closest points of the designated shellfish areas must be fully addressed in this remitted application. We have attached the report, email correspondence and our own maps to aid the inspector/ board at Appendix bundle .

4. Shellfish Waters:

Malahide shellfish waters were Designated Class A at the time of the decision but since then also hold a B classification during outside of the seasonal months. Class A is the highest standard achievable, and the main species harvested is Razor Clam. Inland Fisheries Ireland (IFI) were consulted on this issue but unfortunately their submission was only two paragraphs, that indicated that the Shellfish Directive and Bathing water quality Directive would need to be adhered to in relation to this high capacity sewage outfall. The Sea Fisheries Protection Authority in Howth were not consulted post application which is unfortunate as they are the notification authority for any potential pollution contamination to the Malahide shellfish waters. If they had been consulted they could have provided a map of the Razor clam conservation area for the east coast **(Attached)** which shows that while the area where the pipeline is trenched and the outfall operates is not a designated class A area it is nonetheless a specified zone for razor Clam conservation and is also fished by fishers commercially.

I was able to obtain a relevant observation by the SFPA (attached see page 7 of Appendix) in relation to the Portmarnock South Phase 1 B development, which would construct a much smaller wetlands treated SUDS water outfall into Baldoyle Estuary. This observation would be extremely relevant in this case Their response which stated the following;

2. Baldoyle Estuary feeds directly into the southern end of the Malahide shellfish production area. Malahide is classified as A which permits the direct consumption of razor clams without any depuration or further processing. The Classified status of A affords the Irish Sea razor clam fleet and associated processors direct

access to the Asian seafood market worth in excess of 8.5 million Euro at first sale. Live razor clams are harvested on a year-round basis and arrive in the Asian seafood markets within 48 hours of harvesting.

*3. **Any deterioration in the water quality to the Malahide shellfish production** are will remove direct access to the Asian live razor clam market by the Irish fleet and processors. The Malahide shellfish production has a number of existing outfalls feeding into it from the surrounding areas which add to any risk of a reduction in water quality.*

4. There is the potential for serious risks on food safety if system failure permits untreated sewage into the receiving waters of Malahide Shellfish production area. A robust system must be in place for the early detection and notification to prevent contaminated shellfish reaching consumers and the negative effects on the market.

5. All failures in the system in Mayne Road and Portmarnock bridge stations must be notified to both the SFPA HQ and the local SFPA Howth office so immediate measures can be put in place to ensure that contaminated shellfish does not enter the food chain.

The SFPA's above observation, combined with the summary advice of Ms. Maria Aberson in Irish Waters original report, combined with the (we believe) unsubmitted "All Species" modelling that was "not good", raises a very clear question regarding whether the 300 million litres of sewage effluent discharged into the receiving waters containing Malahide shellfish production beds will impact on the quality of the shellfish waters thus contravening S.I. No. 268/2006 - European Communities (Quality of Shellfish Waters) Regulations 2006, As required by Article 5 of the Shellfish Water Directive 2006/113/EC.

There were some import documents contained in the literature review that Marja Aberson and the Irish Water team referred to. We have attached these CFAS reports at Appendix .

Turbidity Modelling Report:

Techworks have indicated on their webpage and in case studies that they carried out comprehensive Turbidity modelling for the GDDP using Sentinel 2 satellite monitoring amongst other methods , however we cannot locate a copy of the actual report in the application, just references to it. Due to the ability of sediment and high turbidity levels to restrict solar penetration in the water column and impact on ecoli levels and lifespan at the seabed, we would request that this report be made available by Irish Water and entered into the application. We would also ask that they confirm if the results of the turbidity modelling were inputted into the parameters for ecolii modelling? Below is an except from the draft literature review memo from Marja Arbenson hich is attached.

The concentration of the bacteria E. coli within crude sewage itself will not exhibit a clear normal distribution pattern (curve) with often skewed abundances as bacteria often occurs in clumps. Following dilution with the receiving waters, the distribution curve of bacteria will be expected to flatten across its range of concentrations, thereby also increasing its variation in levels (Cefas, 2013). The fate and transport of faecal bacterial once released into ambient waters will be influenced by a number of complex and interacting processes where concentrations may be further affected by temperature, salinity, tidal conditions, current velocities and geomorphological features of the water body itself. Discharges into shallow tidal inlets with constricted entrances may create complex tidal currents and flow patterns restricting the potential mixing and dilution of any contaminants in the water column (e.g. Portsmouth Harbour, UK (Cefas, 2012a)). Discharges into an open coastal system subject to strong tidal currents may promote rapid diffusion and dilution of faecal bacteria levels in the plume. Hydrodynamic modelling of the narrow, Dart Estuary (Devon, UK) were simulated across five days in January for a sewage overflow of untreated sewage discharge of 200 m3 (Garcia et al., 2018). It was computed that overall, the largest area of E. coli contamination (>10 cfu/100ml) occurred during periods of neap tides and low river discharges, but also with a maximum value obtained during neap tide and high river discharges; these both representing the worse-case scenarios. The

exponential decay (die-off) rates of E. coli in the environment will be a function of natural factors including temperate, salinity and irradiation (Garcia et al., 2018). A review by Craig et al., (2004) concludes that in general, within the water column, there is a positive relationship with rates of decay and temperature and sunlight. ***However, an increase in turbidity of the water may restrict any solar penetration through the water column.*** *An in-situ study by Craig et al, (2004), further showed that E. coli can persist in coastal sediments even after any rapid decline of levels in the overlying water. Within contaminated sediments, particle size has also been shown to be important factor with an increase in E. coli decay rates in those sediments comprised of larger particles and containing low organic carbon. It may be that increased nutrient availability in those finer sediment may provide an important food source for bacteria.* Emphasis added.

6. Section 50 Consent required.

This application requires the construction or redesign of a number of culverts. It also requires physical alterations to riverbanks. These activities require consent from the Office of Public Works (OPW) also referred to as "The Commission" in Irish legislation. According to the OPW Section 50 consent information booklet; The construction, replacement or alteration of a bridge or culvert has the potential to change the hydraulic characteristics of a watercourse. If significant, this change may result in:- *"Flood levels upstream of the bridge being increased due to the creation of a restriction in the watercourse. - Flood levels downstream of the bridge being increased due to the removal of a beneficial restriction from the watercourse. - Erosion of the watercourse and/or floodplain being initiated or accelerated due to the restriction increasing flow velocities and turbulence. - Deposition of material in the watercourse or on the floodplain due to a change in flow velocities and turbulence. - Overland flow paths on the adjacent floodplain being blocked or diverted due to the construction of bridge approaches. The above changes to the hydraulic characteristics of a watercourse or floodplain may impact on local flood risk management plans. The OPW has a broader interest in ensuring that the adverse hydraulic effects created by new or existing bridges and culverts are avoided."*

In a similar way to the EPA is the state authority for Waste Water Discharge Licence consent, the OPW are the state authority on flood risk and the designated designated body to be consulted in relation to flood works under Section 50(1) of the Arterial Drainage Act 1945 which states *"Restrictions on the construction or alteration of bridges. 50. (1) No person, including a body corporate, shall construct any new bridge or alter, reconstruct, or restore any existing bridge over any watercourse without the consent of the Commissioners or otherwise than in accordance with plans previously approved of by the Commissioners."*

While there appears to be no direct or specific provision made in national legislation for compulsory consultation by local authority's or The Board with the OPW in terms of developments subject to Section 50 consent, In light of legislative precedence set by similar issue in relation to Waste water discharge licences and dual assessment, it would follow that the same arguments and judicial determinations could be applied to the OPW and Section 50 Consents. Happily though there is a provision in EU law that does provide a requirement for the OPW to at least be notified as a prescribed body in such a situation. Directive 2011/92/EU legislate for the precautionary principle and that Effects on the environment should be taken into account at the earliest possible stage in all the technical planning and decision-making processes.

Article 6 (a) of Directive 2011/92/EU as amended by 2014/52/EU which states; *1. Member States shall take the measures necessary to ensure that the authorities likely to be concerned by the project by reason of their specific environmental responsibilities or local and regional competences*

are given an opportunity to express their opinion on the information supplied by the developer and on the request for development consent, taking into account, where appropriate, the cases referred to in Article 8a(3). To that end, Member States shall designate the authorities to be consulted, either in general terms or on a case-by-case basis. The information gathered pursuant to Article 5 shall be forwarded to those authorities. Detailed arrangements for consultation shall be laid down by the Member States.';

The Board failed to prescribe the OPW as a notifiable body for this application, The Board failed to consult with the Office of Public Works (OPW) in relation to the requirement of a Section 50 Consent for a number of culverts and River Bank works required by this development. The OPW or Commissioners for the purposes of Irish statutes are the only body that can give approval to plans to construct, alter, reconstruct or restore any new or existing bridge, culvert or riverbank in Ireland. Yet the Board without any consultation with the OPW as state appointed technical experts, directed through Condition 13(c) that the culvert should be extended to provide for the full with of the future north south link road, which meant widening the Culvert to 25 metres. In doing so the Board conditioned the building of a new road / culvert combination which at 25 metres would equate to a four-lane road/ bridge. The Board did so without first assessing the potential flood risk that such a long culvert might attract upstream or downstream nor assessing the impact of that potential flood impact on the environment, riverbank or river species, or protected species in Special Areas of Conservation downstream of the works. At the very least they should have requested additional information with regards to the impact the extension of the culvert might have on the Environmental habitats and Natura Sites connected hydrologically to the Mayne river.

In a recent planning Decision F19A/0458, on page 19 of the Chief Executives Order, the Fingal Water services section make comments that supports the argument of OPW consultation at planning stage as follows; "*Any proposed river channel widening will require consultation with both the OPW and Inland Fisheries. The Applicant shall note the requirements of Section 50 of the EU regulations SI 122 of 20110 (assessment and management of flood risks) and Section 50 of the Arterial Drainage Act of 1945. It is noted that this issue was raised in the submissions received. It is questioned if the layout would be required to be altered following consultation with the OPW. On consultation with the Water services Planning Section, it is submitted that the layout would unlikely be changed but would require consultation with the OPW to ensure the sizing of the culverts are correct.*"

As the Board failed to direct the Applicant to consult the OPW as a prescribed body under the precautionary principle and Directive 2011/92/EU as amended by Directive 2014/52EU in the first instance and as they themselves failed to consult the OPW when making a direction to substantially alter a culvert by way of condition in the second instance, there is not sufficient information to assess the. impact of the culverts from the development on the watercourses they traverse.

7. EIAR Portal.

Due the observation of Fingal Couny Councillors when commenting on the initial application for the GDD development, it became apparent that the applicant failed to submit the full EIAR on the 20th of June 2018 to the Board with its application. As such the Board exercised its powers under section 37F of the Planning

Act 2000 and directed that a further notification period, an additional consultation with the public would be required. The Board also directed the Applicant to "*notify the same prescribed bodies as per the original planning application*". This supplemental planning application was in addition to (in the boards own words) "the original application" and was dated the 13th of September in the newspaper articles. As the supplementary application is dated the 13th of September it was subject to S.I. No. 296/2018 - European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018 in relation to the lodgement of an EIAR to the EIA Portal. The Board under the same statutory instrument should not process an application that is subject to an EIA and the submission of an EIAR without a confirmation notice of acceptance of application onto EIA portal. As no confirmation notice has been lodged this application is invalid. As the EIAR is now out of date and requires all surveys, reports etc to be updated this should be done via a new and valid application fro SID planning consent.

8. Further consultation with prescribed bodies addendum:

A number of prescribed bodies including councils were not given their statutory opportunity to comment or vote on the addendum. There were also major inconsistencies in the information in the reports given to councillors to comment and vote on see appndix . We have also have serious concerns about the deficiency in data relating the the Material contravention of the Fingal Development Plan in relation to Greenbelt zonng and the Waste recover facility of the Sludge Hub Centre (SHC) . In FCC Chief Executives report to the Board as a prescribed body to the application the material contravention is dealt with as follows:

> Planner's Note: During the presentation of the Chief Executive's report to the Elected Members, attention was drawn to the consideration of the Sludge Hub Centre (SHC) as an integral part of the Waste Water Treatment Plant (WWTP) and assessment of the SHC as 'Utility Installations' along with the WWTP as a consequence. The presentation can be viewed under Item 21 at:-
>
> https://fingalcoco.public-i.tv/core/portal/webcast_interactive/369680

The indication is that the SHC was fully explained to the councillors. The webcast was not available online but I received a copy and can confirm that it is our belief that in fact the issue was barely address or flagged with councillor and that in effect they were not informed or briefed on this serious issue. A copy of the meeting recording is available on USB by request . It is our belief that a legal consultation with elected councillors relating to the material contravention of a waste recovery facility with biogas storage on a greenbelt site has not been carried out.

7. Wetlands and Waterbirds:

One of the Special Conservation Interests (SCI) for Baldoyle Bay SPA include SCI Code "A999 Wetlands & Waterbirds". However, the applicant transcribed this code incorrectly as "A999 Wetlands" in the Natura Impact Statement and therefore did not fully assess the "waterbirds" feature of the SCI. Thus, in turn the Inspector and the Board only assessed the Wetland feature of this SCI. This became apparent in the Inspectors report published with the Order, with just a small paragraph given over to the assessment of wetlands and none to any of the other 50 water bird species that use this SPA and RAMSAR site and are dependent on the wetland habitat. Therefore, no stage two assessment was completed for the Waterbirds Interest of SCI code A999.

The importance of assessing impacts on waterbirds is identified in Baldoyle Bay SPA Conservation Interest supporting document – by the NPWS which discusses water birds in detail and lists a number of water bird species. Section 5.4.1 (page 33) states

"At site level, the concept of 'favourable status' is referred to as 'conservation condition.' This can relate not only to species numbers, but importantly, to factors that influence a species abundance and distribution at a site. The identification of activities and events that occur at a designated site is therefore important, as is an assessment of how these might impact upon the water bird species and their habitats, and thus influence the achievement of favourable condition. Site-based management and the control of factors that impact upon species or habitats of conservation importance are fundamental to the achievement of site conservation objectives.

Page 44 of the same document also states: "*The site is a Special Protection Area (SPA) under the E.U. Birds Directive, of special conservation interest for the following species: Light-bellied Brent Goose, Shelduck, Ringed Plover, Golden Plover, Grey Plover and Bar-tailed Godwit. The E.U. Birds Directive pays particular attention to wetlands and, as these form part of this SPA, the site and its associated waterbirds are of special conservation interest for Wetland & Waterbirds*"

CJEU case law very clearly states that "*Article 5(1) and (3) of, and Annex IV to, Directive 2011/92/EU of the European Parliament and of the Council of 13 December 2011 on the assessment of the effects of certain public and private projects on the environment, must be interpreted as meaning that the developer is obliged to supply information that expressly addresses the significant effects of its project on all species identified in the statement that is supplied pursuant to those provisions".* As both the developer and the Board have omitted and therefore failed to assess part of Special Conservation Interest A999 Wetlands and Water birds, appropriate assessment has not been fulfilled and the Order must be quashed.

The list A and B of waterbirds to be assessed under "A999 Wetlands and waterbirds" can be found here. **https://natura2000.eea.europa.eu/Natura2000/SDF.aspx?site=IE0004016**

8. Sillogue Nature Development Site.

Sillogue Nature Development Site (Northpoint NCT Site). During the oral hearing a submission by Michael Keating was submitted with surveys of this site by Rob Gandola the Senior Science Officer with the Herpetological Society of Ireland, Mr. Gandola was working with South Dublin County Council surveying at the time , that Sean Walsh Parks bio diverse habitat (a site similar in biodiversity to the Sillogue site) was erroneously destroyed. He is an expert in his field and is regularly consulted with by Local Authorities.

Mr. Gandola's report identified frog species listed on Annex V of the Habitats Directive and protected from unauthorised killing by Article 15 and of the Habitats Directive. The Applicant had completely missed this protected species on their surveys of the site. The report also identifies the Sillogue site as an important frog spawning ground and a rare self contained biodiverse community that should be afforded protection. After accepting the importance of this new information the Inspector and The Board did not seek additional information in relation to potential impacts or mitigation of same impacts, of the project on the site. Instead they against all protocols in Environmental Impact Assessment and Appropriate Assessment the now quashed decision inserted Condition 14(b) and 14(c) which respectively stated:

(b) Prior to commencement of the relevant phase of the proposed development, the developer shall submit for the written agreement of the planning authorities full details of all measures to protect badgers, bats, smooth newt and common frog, which shall be based on follow-on surveys, where necessary, and which shall incorporate any requirements from licences obtained from the National Parks and Wildlife Service (NPWS).
(c) Habitat restoration at construction compounds 9 and 10 and at Sillogue Nature Development Area shall be in accordance with the requirements of the relevant planning authority.

In the quashed decision The Board conditioned a survey to take place post consent to identify the extent of protected species not identified in the EIAR and NIS. They also conditioned the identifying of mitigation protection measures and restoration measures for Habitats Directive protected species to a post consent stage without the Board as the competent authority performing a stage two assessment of same. It is impossible to reasonably ascertain if the project will have any significant negative impacts on these Annex V species without these surveys and mitigation proposals assessed before consent is given. Therefore, at this point in time a decision caannot be madr as the Board do not have sufficient information before them to make such a determination. If the EIAR/ NIS are not up to date and are not supplemented before the Board make a decision then the board should refuse permission due to lacunae in the application.

Very recently as confirmed by Experts in Dublin City Council and Fingal County Council an extremely rare species of Tollypella Intricata has been discovered by Michael Keating see appendix within the route of the pipeline in an area due to be fully excavated by the Orbital Pipeline route. The species is completely dependant on the exact environmental and ecological conditions of the site in

inhabits. There are currently ongoing talks about how to protect the rare species with Fingal County Council and the information is so sensitive that it cannot be put in the public domain but we will provide Irish Water Experts and ABP with the information and location of the rare species in order for the need for further avoidance/ mitigation of the route of the development to take place.

9. Ireland's Eye SAC:

In their NIS the Applicant screened out Ireland's Eye Special Area of Conservation despite it being the second closest SAC to the outfall discharge point and trenched pipeline route (approximately a kilometre away) after the Rockabill to Dalkey SAC. The Applicant claim this was because the qualifying interests were terrestrial and above the waterline and as the outfall was in the marine environment there was no pathway receptor. Fingal County Council's submission raised concern about this omission in the application. The Applicant put forward the argument that because the Island, surrounded by water, is itself terrestrial there would be no significant impact and therefore Ireland's Eye SAC could be screened out. Incredibly on page 247 of her report the Inspector agrees with The Applicant where she states. *"Regarding Ireland's Eye SAC, which is 1km south of the marine outfall the applicant's submission is that this site is designated for coastal and not marine habitats. There is no hydrological link and no open pathway of effect, thus there is no real possibility of LSE's.*

On page 248 the Inspector states. "Based *on this statement and the available information presented in the EIAR, the NIS and the background studies and the oral hearing discussion I am satisfied that the evidence firmly discounts any likely significant effect on the habitats which are qualifying interests. I consider that there is sufficient objective information to enable the Board to conclude that Ireland's Eye SAC can be screened out from further consideration."* In this statement the Inspector confirms that she relies solely on The Applicant's evidence and yet also states that this information is objective which we believe to be irrational and contradictory.

In their mitigation suggestion for the disposal of Dredge material the applicant suggest that spoil will be released only on the flooding tide to avoid impacts on sensitive locations around ire lands eye for which there is a pathway receptor which appears to contradict the previous reasons for screening, out.

In relation to the screening out of Ireland's Eye SAC, at the oral hearing I raised the potential of Algal blooms and sewage pollution (e.g. microplastics) via marine inundation to impact significantly on the Islands Special Conservation Interests of vegetated stony banks and lower areas of vegetated sea cliff where the land meets the water during high tide and storm events. In the document Conservation objectives supporting document- Coastal habitats by the NPWS there is reference made to communities and species whose cliff habitat are within the splash zone. In relation to Vegetated stony bank the supporting document states the following in relation to conserving the habitat type. *"The health and on-going development of this habitat relies on a continuing supply of shingle sediment. This may occur sporadically as a response to storm events rather than continuously. Interference with the natural coastal processes, through offshore extraction or coastal*

defence structures in particular, can interrupt the supply of sediment and lead to beach starvation." Harmful Algal Blooms (HABs) could have an irreversible impact on this SAC.

Attached at Appendix please find a report by Seastainablity which identifies microplastic and marine litter which regularly washes up on Ireland's eye within the high tidal zones and splash zones, including SCI's for Ireland's Eye SAC. The microplastics have been found collected in birds nests. It is not enough for Irish Water to assess only microbeads they MUST also access the impact of microplastic and be cognisant of legislation at EU level in relation to same.

Elevated levels of two species of *Pseudo-nitzschia and of Azadinium/heterocapsa spp* have been recorded in multiple samples taken by the Marine Institute in the last years in Malahide shellfish waters. These species are toxic algal blooms which can have serious impacts on shorelines, and shellfish in the aquatic environment. Warm summers as a result of climate change, in addition to increase in Nitrogen and Phosphorous that the sewage effluent will discharge, gives an elevated risk to these shallow transitional waters of Hazardous Algal Blooms. Algal blooms could decimate Ireland's Eye's SCI's of **vegetated stony banks** if they wash up on the shore, in addition to causing toxic pollution of the shellfish harvest in the area. This issue was raised by myself at the oral hearing and by observers in earlier written submissions, something the Inspector made no note of in her report. It is irrational of The Board not to apply the precautionary principle in relation to Ireland's Eye SAC. A thorough assessment with no lacunae must be carried out.

Another concerning aspect in relation to the Board screening out Ireland's Eye SAC was it also means that the impact of the construction phase and operational phase of the marine based outfall on protected species for which Ireland's Eye SAC is their Habitat. Unlike the Special Conservation Interest these protected species which include the Grey Seal and Harbour Seal would be severely impacted by the project as their habitat consists of terrestrial habitat on the Island and Marine habitat in the waters surrounding the Island. Ireland's Eye supports 50% of the population of grey seals in Dublin Bay and the pups will be learning to swim in the waters surrounding the outfall during late Autumn early Winter months when inundation levels are at their highest. Grey seals also breed on the East of the Island which is the side of the island closet to the pipeline, outfall and diffuser. During the operational phase the release of sewage effluent within 1km of their breeding grounds will affect visibility and introduce pathogens, microplastics and long-term bioaccumulation of persistent toxins, which as a marine mammal is a serious health issue issue for the species.

10. Seals and Seal Sactuary

The Irish Seal Sanctuary are particularly concerned about this, and have issued a commentary report ATTACHMENT X to my submission to that effect. The Applicant stated that they had consulted with the Irish Seal Sanctuary but they failed to discuss in their EIAR any of the objections that the Irish Seal Sanctuary raised at that meeting and in a subsequent email. They also refused the Irish Seal Sanctuary's offer of trained staff for the survey element of the project. Seals as marine mammals bioaccumulate toxic substances such as PCBs , POPs and CECs and digest micro plastics that will be contained in the effluent that will issue from the outfall. As such the impact of the discharge on these sea mammals must be appropriately assessed in both the NIS and EIAR.

In relation to the Screening out of Ireland's Eye and therefore the protected species that make it home, at the oral hearing I raised the issue of the large aforementioned breeding seal colony on Ireland's Eye and the fact that it had not been assessed in terms of impacts. Later in drawing her conclusions the Inspector stated *"In relation to the stated growing importance of Ireland's Eye for seals based on recent surveys reported to the hearing by Ms Joyce Kemper, these may be part of the Lambay Island population. The mitigation proposed would be equally effective at preventing adverse effects to seals using Ireland's Eye. I consider that it can be concluded with certainty that the conservation objectives for the qualifying interests of Lambay Island SAC would not be compromised as a result of underwater noise and disturbance."* Equating the same impacts and mitigation measures in terms of noise in relation to the seals on Lambay Island which is 15-20km away with those on Ireland's Eye 1 km away from the piling and drilling flies in the face of common sense. The impacts are incomparable and have to be assessed individually. The same can be said of the operational sewage effluent plume. The Irish Seal Sanctuary report confirms that Ireland's Eye is a colony in its own right and direct and indirect impacts in terms of Ireland's Eye as a SAC should be assessed.

In terms of the Inspectors reference to Lambay Islands seal colony, the data used to assess the seal population was ridiculously out of date in terms of scientific methodology (populations quoted in NIS and EIAR related to Island surveys from 2003 and 2005) and the Irish Seal Sanctuary could have supplied up to date figures if Jacobs Tobin would have consulted with them. I have also been party to email correspondence with the Baring family who are the owners and conservation custodians of Lambay Island. My group first made contact with them just before the oral hearing at which point, they informed us that they were completely unaware of the Greater Dublin Drainage Project planning application as no one had been in touch with them as a priority stakeholder. Due to the fact that the Island is cut off from the mainland, they are relatively limited on postal and other Communication (access to newspapers/ Site Notices etc.) The Baring family and the experts in their employment could also have informed the Jacobs Tobin survey team of the actual current population of Seals and Birdlife on Lambay Island if they had have been consulted. They are after all the custodians and the sole conservation management team for the Lambay Special Area of Conservation, no one can land on the island without their permission and it was never requested according to the Baring family. This is a further indicator that the EIAR and NIS in relation to Lambay Island SPA and SAC was not robust and was lacking in up to date surveys and information.

In screening out Ireland's Eye SAC its qualifying interests which are terrestrial but subject to marine impacts and also therefore hazardous polluting substances within the marine environment The Board have failed to carry out a stage two assessment in its entirety. The Board has failed to appropriately assess a Special Area of Conservation and all of its protected species, which are in close proximity to the marine outfall, for construction and operational impacts. Under the precautionary principle, the Inspector in the first instance and The Board in the second instance should have insisted on assessment of Ireland's Eye SAC under the Habitat's Directive. In case C461/17 Holohan and Others v An Bord Pleanála, the court deemed that an appropriate assessment undertaken under the Habitats Directive must catalogue all habitats and species for which a European protected site is designated. The appropriate assessment must identify and examine the implications of the project for the species present on the site, including those which do not relate to

a site's designation. Implications for habitat types and species found outside the boundaries of the designated site should also be included, provided the implications are liable to affect the conservation objectives of the site. This judgement would indicate that the Board did not apply the precautionary principle and in screening out Ireland's Eye SAC, failed to undertake appropriate assessment as required by the Habitats Directive.

11. European Eel:

The European Eel (Anguilla anguilla) is a critically endangered species on the IUCN red list. The EU has taken measures to ban fishing of the Eel for periods in 2019-2021. On page 67 of Environmental Impact Assessment Report: Volume 3 Part A of 6 Chapter 11 Biodiversity (Terrestrial and Freshwater Aquatic) the applicant refers to the presence of European Eel in the Mayne and Cuckoo rivers. The only pathway for glass eels (juvenile form of European Eel) to reach these rivers would have been via Baldoyle Bay Estuary. Despite this, the Applicant failed to assess the impact of the project on European Eel in terms of dredging and micro tunnelling. The issue was raised in public consultation / scoping regarding Baldoyle Bay being a migratory estuary for European Eel. The Applicant referred to 2016 surveys by Inland Fisheries Ireland for the Mayne but failed to mention the survey completed in the same year in the Sluice river which also identified European Eel had migrated upriver to spawn. The European Eel is affected by substrate vibration and auditory damage which would be caused by construction, piling, and heavy machinery at compounds 9 and 10, at the interface , Cable crossing and outfall and by vibration of tunnel boring machine. The tunnel route bisects the migratory path of glass eels to the Sluice River and therefore would create a vibration barrier that the eels would not cross due to avoidance measures. Due to the Tunnel route and Construction compound 9's proximity to the Mayne river mouth, the European Eels migration up this river may also be affected. This was not assessed in the EIAR. The Board members in not engaging their Ecologist to review the EIAR and NIS failed in determining if the EIAR was robust enough and did not have lacunae, in particular on this issue.

12. Doldrum bay and cumulative discharges:

Cumulative impacts were not accessed from Doldrum Bay raw sewage discharge. In the oral hearing I raised the fact that The Applicant had failed to include the raw sewage discharge from Doldrum bay in Howth Co. Dublin, as a cumulative impact. The Applicant stated that they would have this raw sewage connection diverted by 2021 before the plant is operational and therefore should not have to asses it as a cumulative impact. The discharge has not yet been diverted yet which hs now been delayed since 2012 and no guarantee to meet future proposed deadlines. Planning is only due to be submitted Q4 2022 with the construction not nearing completion until 2024. The Board should insist that the Doldrum bay discharges be included in assessment of cumulative impacts as

Applicants cannot rely on future mitigation to screen out significant impacts. The Applicant has already made commitments to cease discharging raw sewage from Doldrum bay when applying for a discharge licence for Ringsend in 2010. The discharge licence given to the Ringsend treatment plant in 2010 required that the Doldrum Bay discharge be ended by December 2011. The applicant also made representations to the EU commission that they would cease the discharge of raw sewage at Doldrum Bay Howth. Neither of the written commitments to cease the discharge of raw sewage at Doldrum bay has been kept. The applicant's failure to meet its obligations not just once but twice means that they cannot be relied upon to do so on this occasion, and as there can be no guarantee that they will do so by 2024, the raw sewage outfall should be assessed as a cumulative impact and the Board should uphold this request. Case law states that mitigation measures can not be used to screen out an impact before appropriate assessment and as there is any doubt as to whether this future mitigation can be relied upon under the precautionary principle,.

12. Sutton creek discharges.

We were a[approached by number of observers to the GDD project regarding the discharge of raw sewage in Sutton strand by St Dominics High school. We investigated and it appear that there is a historical mis-connection from a housing estate in the vicinity of st Dominic's high school that results in a raw sewage discharge to the beach via surface water overflow. We witnessed faecal matter, sanitary products and wipes at the location. This may be an issue similar to Doldrum bay and may warrant. Th issue was actually raised at a recent consultation of the Doldrum bay outfall by a completely unrelated third party and Irish Water said they would investigate.

13. Portmarnock Pumping Station:

Cumulative impacts not assessed - Portmarnock Pumping station and associated North Fringe Sewer connection: In August 2019 The Applicant Irish Water lodged a planning application Reg Ref: F21A/0398 with Fingal County Council. The project description is as follows. *New wastewater pumping station on an approximately 0.5ha site and associated network infrastructure to include gravity sewer and rising main connections. The proposed wastewater pumping station compound, within the townland of Maynetown, will be approximately 115m x 62m and the pumping station will comprise of: below ground pumping station structures, connection pipeline from the pumping station of approximately 1.95km in length which will connect with the North Fringe Sewer in the townland of Stapolin.* A Natura Impact Statement was also prepared to accompany this application. Having researched the project online, I discovered that Irish Water had commissioned Mott McDonald to prepare a draft AA Screening report in 2017 for Portmarnock Foul Water Pumping Station. So they were aware of the upcoming project well before they lodged the application for the Greater Dublin Drainage Project in June 2018.

The Portmarnock Pumping Station project will require wayleaves, manholes and trenches in the exact same area of Maynetown that compound nine and its associated pipeline corridor will require. It will also traverse and require trenching within the Light Bellied Brent Geese and Lapwing quiet zones that the Greater Dublin Drainage Project also does, and so the Portmarnock Pumping Station project will also result in permanent habitat loss of a protected site for its rising main

pipeline infrastructure. There is also possible interaction here in terms of project splitting which needs to be identified as the applicant never answered questions raised by representatives for Gannon homes during the oral hearing as to how the Sewage in the North Fringe Sewer below the Clonshaugh diversion would be pumped back up to Clonshaugh. The New Portmarnock Pump house may be the answer they did not want to provide due to project splitting concerns.

Fingal County Council granted permission to F21A/0389 but it was appealed to An Board Pleanla for a number of reasons the most serious of which is that Irish Water appear to have already built part of the rising main without planning consent or an AA. Close to compound nine of the GDD development. This unauthorised development was intalled under contract by Fingal County Councils contrcator for the Baldoyle to Portmarnock Cycleway. We believe Fingal CC should have refused to accept the planning application under section 34(12) of th planning and devlopment and it is one of the basis of our appeal to ABP. However the fact that part of the rising main that is to traverse Compund 9 of this development which is also a protected quiet zone for brent geese means that robust AA must be carried out by the board on this cumlative impact. Cognisance of Irish Waters decison to build a rising main without development consent when requireing an AA and the legal implications of this must also be borne in mind.

14. Regional Biosolids Storage Facility:

We were concerned when we heard that the RSBF in Kilshane is being constructed. We were under the impression due to representations made by Irish Water to ABP during the planning process and in pre planning meetings, that planning consents for the Ringsend Extension application and the GDDP planning application were required to progress the RSBF. The RSBF is proposed to hold 3.6 million PE of biosolids 2.4 million of which will be from Ringsend and th balance from the Greater Dublin Drainage Project WwTP. Early on it was agreed that the RSBF would be included in both planning application with the second grant of permission for GDDP referencing to the conditions and grant in the Ringsend grant of planning to allow the development to proceed. The drawings and environmental impacts for the RSBF featured in both planning applications and indeed Irish water drew up separate EIAR (not sure about NIS) for this purpose. As it is a shared feature for both applications it requires grants of planning from both applications to proceed. The fact that works have already started, such works could be identified as unauthorised development. The board need to take legal advice on this issue before making a decision and if a decision is made show a clear process of decision in their reasons and considerations.

When drafting their now quashed order Order for 301908, The Board added Condition 12. This condition requests that design details of the Regional Biosolids Storage Facility (RBSF), plus a risk assessment report be submitted to the planning authority, Fingal County Council, in order to prevent environmental pollution in the event of a fire occurrence. This is yet another example of The Board not identifying direct or indirect impacts on the environment as a result of this project and again the impact and mitigation of a Fire event at the RBSF must be assessed pre consent not left to a post consent condition. Particularly in light of the Water Framework Directive requirements and the current status of the ward river which is linked by a tributory that runs along the boundary of the RBSF site.

15. Phasing of the Waste Water Treatment Plant at Clonshaugh:

During the Oral Hearing a number of observers including Terri Gray, made reference to zones for expansion being included in all of the Clonshaugh Wastewater Treatment Plant Drawings. I reviewed the planning application and also requested to view the Pre-Planning Application file in An Bord Pleanala Offices. Based on the minutes of the meetings in the Pre Planning Application File PC152 it became clear that when the pre planning application process began, the final design of the plant was to be for 750,000 PE. At these meetings The Applicant indicated that the project would be completed over two phases. Phase one would be for 450,000PE capacity with the infrastructure for a 750,000PE pipeline put in place during this phase. Phase two was for project infrastructure for an additional 350,000PE capacity. This would be in line with the recommendations of the Greater Dublin Strategic Drainage Study (GDSDS) which said that the capacity that would be required in order to meet the needs of future loading to the Greater Dublin Area would have to be for a 750,000 PE to 850,000 PE Wastewater Treatment Plant.

However, The Board in a subsequent meeting informed The Applicant that phasing would constitute project splitting and that under Appropriate Assessment protocol The Board would have to assess the whole project in one application and therefore the first application. They confirm that an EIAR and NIS should represent the entirety of the project i.e. 750,000 PE plant and cautioned against relying on putting in infrastructure for the full capacity but only preparing an EIAR and NIS for the first phase capacity. At its next meeting with The Board, The Applicant announced that they would only be making an application for a 500,000PE wastewater treatment plant. This was a surprising announcement as it meant that the proposed project no longer met the needs of the Greater Dublin area as confirmed by the Greater Dublin Strategic Drainage Strategy which informed the capacity required for the plant. In substantially cutting the capacity of the Clonshaugh plant and Irish Water were ignoring the recommendations of the GDSDS. Based on the comprehensive loading forecasts by the GDSDS it meant that the Clonshaugh Plant would be under capacity from the day that it was commissioned. This would make the project unsustainable and not fit for purpose.

Once the actual application was submitted under case reference PL.06.301908, it transpired that all of the indicative plans which would be more in line with an application for outline permission than full permission, for the wastewater treatment plant in Clonshaugh have earmarked areas for later expansion of the plant. The reports on flow rates of effluent within the pipe network and at the outfall also mention a rate of 3.6 litres per second for current operations and 5.6 litres per second for future flows. In addition, I have obtained the tender documents for the Design Build Operate contract (Attachment XX) and in it they refer to the project design being extended to 800,000PE. But most imprtantly that they will be building infrastructute dor 800,000 capacity IN THIS PHASE. And that the current planning and tender will include infrastructure capable of 800,000PE. The diameter of the pipe of 2 meter internal would also be indicative of catering to larger flows consistent with a Full Flow Treatment (FFT) for 800,000 PE. IF only 500,000 PE is to be built then the choice of a smaller land parcel and pipe diameter should reflect that, and alternative options and

sites revisited. When the size of the plant was reduced the ASA process was not revisited as it legally should have been.

The Inspector referenced future expansion of the Clonshaugh Wastewater Treatment Plant in her report on page159 where she states: "*The GDD is to be developed in a single phase and there is no indication of plans to develop further phases at this time, although previous proposals were for a higher PE level and the project incorporates space for expansion should that be required. There is no requirement for the Board to assess any future phases*" . We believe the Inspector is completely incorrect to come to this conclusion when all indications in design plans and reports are that future expansion is being incorporated into the planning application and there for the consent if it is granted. The tender document exhibited now provides proof or indication of this. Case law is very clear on this point. Particularly in light of statements made by the applicants which she also includes in her report most notably on page 62. *"As Mr O'Keeffe indicated to the hearing the provision of headroom constitutes a new practice. By maintaining tight control on the connections policy Irish Water will be in a position to foresee upcoming capacity constraints and to address any issues in a timely fashion before any overloading arises. If a major mobile international industry was required to be served then the capacity would be in place in the early years when the full 500,000 P.E. of the plant will not be needed. A further application for expansion might then be needed earlier than currently envisaged. (Day 6,15.15)."* The use of the term "currently envisaged" is a clear indication that expansion is planned at this point in time. In addition there is no way to stop a plant at 500,000PE exactly. As we can see from the Ringsend plant that is granted planning for 1.6 Million PE but is currently overloaded processing up to 2.1 million PE according to the 2020 Ringsend Annual Environmental report. This is despite it original planning stating that it would not exceed its designed PE. Under a precautionary principle worst case senario if the design currently designed for (2 metre internal pipes) has built in expansion and is at all capable of processing more than 500,000PE then this should be addressed in the EIA and AA.

In light of the fact that the plans that consent has been applied for and the usual condition no 1 of all ABP grants of planning usually direct consents be carried out and completed in accordance with the submitted plans, this would then include expansion. As such the EIAR and NIS should include the expanded capacity. The Board failed to have cognisance of and implement case law in relation to project splitting most notably C-392/96 which states; *"The purpose of the EIA Directive cannot be circumvented by the splitting of projects and the failure to take account of the cumulative effect of several projects must not mean in practice that they all escape the obligation to carry out an assessment when, taken together, they are likely to have significant effects on the environment within the meaning of Article 2(1) of the EIA Directive."*(C-392/96, Commission v. Ireland, paragraphs, 76, 82; C-142/07, Ecologists en AcciónCODA, paragraph 44 ; C-205/08, Umweltanwalt von Kärnten, paragraph 53; Abraham and Others, paragraph 27; C-275/09, Brussels Hoofdstedelijk Gewest and Others, paragraph 36)

In relation to the phasing we now have additional evidence that Irish Water considered the communications impact of including the phase two development of the GDD in the initial planning application. We have attached the relevant report entitled Assessment *of timing/ phasing of North Fringe sewer to GDD* at appendix . It appears Irish Water considered the positive and negative impacts of omitting the phase two development on page 17 of the report entitle communication risks. In the negative assessment it states

" The inclusion of NFS in the GDD project necessitates upgrading the WWTP at Clonshaugh from a 420,000 PE plant to a c.a. 600,000PE plant. To date all communication associated with a new plant at Clonshaugh has been based on a 420,000 PE plant. An increase in plant capacity runs the risk of heightening objections and fuelling the argument that the plant is not serving the immediate locality but is in fact serving communities from much further afield."

16. Blanchardstown Regional Sewerage scheme.

During the Oral hearing Irish Water made the statement that in the event of a 3 day plant failure there would be enough capacity in the sewer network, Abbotstown and Ballymun pumping stations to cater for a 3 day load of sewage. We had an engineer do some quick calculations and according to his figures the capacity of the network to hold untreated sewage is severely deficient contrary to Mr. O'Keeffe's assurances. No actual figures that identified the proposed capacity in a quantifiable amount was produced. No calculations of the actual quantifiable amount of sewerage that would need to be held was produced. If the the two pumping stations stop then the sewerage up network of both those pumping stations would overflow into the water bodies that the SCA and SWO are designed to discharge into. This include the Tolks which is a direct pathway receptor to the Tolka Estuary SPA and Bull Island SAC/ SPA.

The GDD project is design to connect with the 9C sewer at Blanchardstown where currently there are storage tanks being completed to store the overflows produced by the 9C sewer at this moment in time. It is likely that the GDD intend to use these storm tanks to store its network overflows as referred to by Mr. O'Keeffe but there is no evidence that there is enough capacity in the Blanchardstown tanks which were primarily designed for just the 9 C sewer network. Once connected to the GDD these tanks will have to potentially take the surcharge in the network for the North Fringe Sewer and the 9C network. I say again there is no quantifiable evidence before the board that there is capcity in the network to deal with a 1 day process failure never mind a 3 day failure.

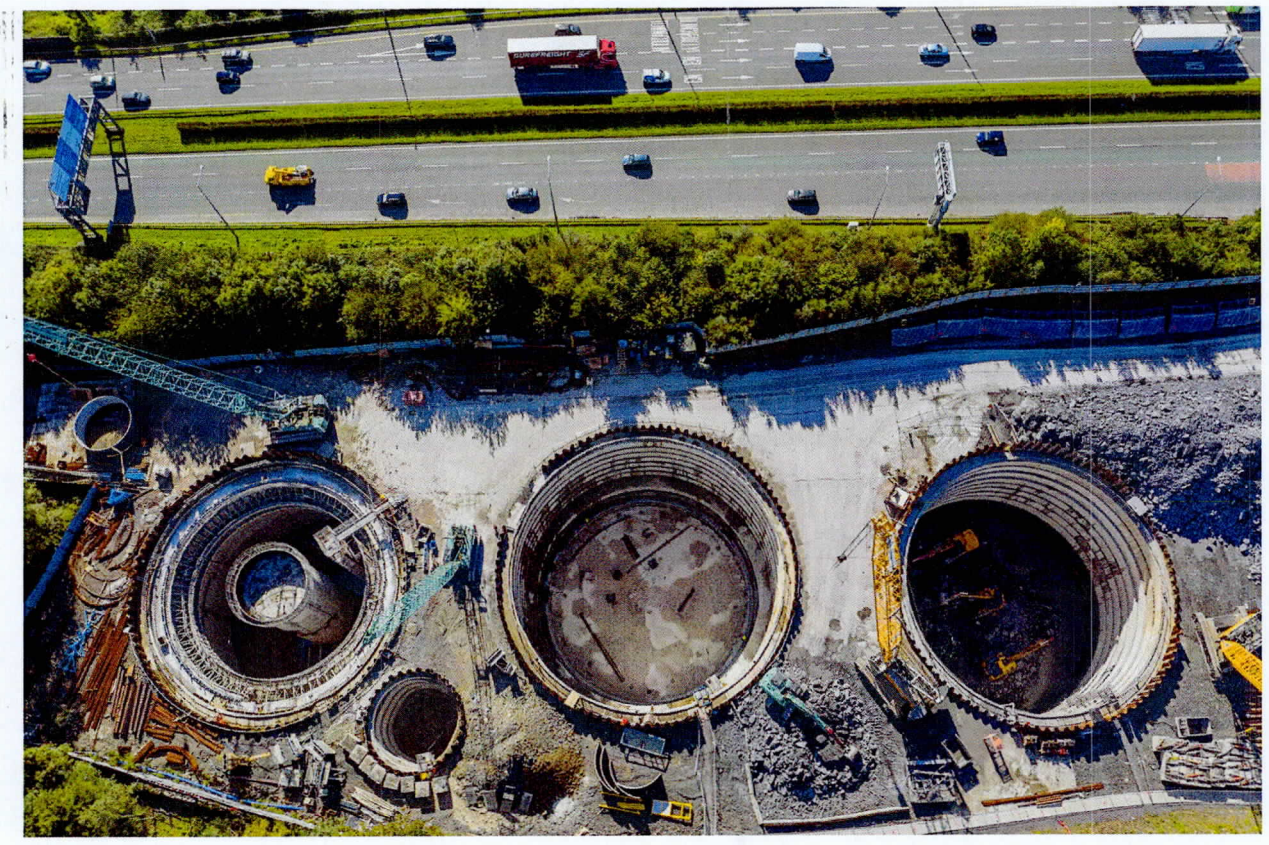
As a result of this lack of capacity it appears that the holding tanks at Blanchardstown will be forced to release raw sewage through its emergency outfall to the Tolka River. The load released in a 3 day event would be environmentally catastrophic to the river. Nowhere in the EIAR or the NIS for the Greater Dublin Drainage Project was an assessment of large amounts of raw sewage entering the Tolka as a result of a failure at the Clonshaugh plant assessed. This is due to another form of Project splitting. The Blanchardstown tanks were submitted on a separate and now granted planning application. The inspector said that she could not have regard for the observers who made excellent comments on impacts caused by the raw sewage in the Blanchardstown tanks because it was part of a planning application already decided. I put it too the board that similar to the RSBF appearing on two planning applications for Ringsend and for the Greater Dublin Drainage application, then so too should the Blanchardstown planning application have been assessed with the GDD application as its infrastructure is integral to this applications mitigation measures and environmental impacts. We have attached the technical amendment to the Ringsend WWTP Discharge Licence which identified the overflows and discharges from the 9C and Blanchardstown tanks. In the GDD is

connected this will increase to include NFS catchment. This application should assess these discharges to the Tolka and any other water bodies along as far as Leixlip.

The issue of project splitting with the Blanchardstown Regional Drainage Scheme has become even more apparent since we have discovered via AIE/FOI request that a section of the GDD project has already been constructed by the BRDS contractor, we beileve without planning consent. As such the Board may be forced by law to refuse to process this application, as the as built GDD Chamber is not included in either application documents but is very clearly part of the the GDD project. The section of development we believe has already been built wihout consent is the GDD reception chamber, orbital sewer connection and a section of orbital sewer pipe. Essentially of of the components of the BRDS/ GDDP interface . However the infrastructure that has been build does not have planning consent. It was not part of the BRDS grant of planning. That we can see. We have attached Appendices which show:

- Two design drawings of the GDD chamber.
-Emails showing that the GDDP team visited the BRDS site to view the chamber
-Emails reffering to the compiling of as built drawing for the GDD Team
-Photos we believe were taken by the GDDP team during the site visit of the chambers
-Current google satellite map clearly showing the unauthorised as built chambers
-Printout of Byrne Loobey website clearly showing unauthorised chamber.
-list and printout of drawings from BRDS application FW17A/0083 which do not include any design drawing for the GDD Chamber nor any reference to it that we can see.

We received this info via FOI. It shows that there appears to be a certain level of awareness of the section being design and constructed at this point in time i.e. GDD reception chamber and associated infrastructure connecting Orbital sewer. Questions must be asked regarding the consent process and overlapping of these developments. Below photo from Byrne Looby Website (see appendix) in a larger format.



17. Bentonite Breakout Risk.

Bentonite Breakout risk. One of the significant negative impacts that the Inspector and Board identified and discussed was that of Bentonite Breakout also known as an Inadvertent return or Bentonite spill. A section of the project involves tunnel boring under Baldoyle Bay Estuary which is a Special Protection Area, Special Conservation Area, a RAMSAR protected site and a National Heritage Area. The project NIS lists a bentonite leak as being a likely significant effect *"Possible deterioration of water quality of estuarine habitats due to pollution events or suspended sediment plumes during construction of marine project elements including bentonite blowout or surface venting."* The NIS also states; *"6.2.1.3.3 Bentonite Release. The risk of a surface breakout by bentonite drilling fluid* ***cannot be negated completely due to variability in the underlying geology.*** *Bentonite is used during the drilling operation to lubricate during micro-tunnelling or TBM progress during construction and is pumped into the cuttings annulus during operations at the ambient pressure at the rock face. A detailed geophysical survey has been carried out along the proposed route in order to anticipate the risk of weak formations and possible faults that may increase the risk of a bentonite breakout. However, should the TBM encounter voids within the formation (such as a fissure or weathered area of rock), and then material can be forced to the surface under pressure to create a breakout. In the littoral and sub-littoral environments, the presence of bentonite at the surface can have a notable impact on sediment turbidity and suspended load. This increase in turbidity could result in increased siltation and the smothering of sediments and organisms accompanied by a reduction in the light available to the seabed for photosynthesis."*

The mitigation measures in the case of a breakout according to the NIS are as follows: *"The control and management of pressures during the micro tunnelling processes is undertaken to prevent air and bentonite breakouts. However, in the unlikely event of a bentonite breakout occurring, which results in a salt-marsh area high up on the foreshore being covered, intervention will be required. Intervention will involve washing the vegetation using a seawater pump and spray. Typically, this would be carried out during a high-water period where washings can disperse out of the estuary naturally. Sites will only be accessed by foot (without the use of plant). Should bentonite breakout in a salt-marsh area lower down on the shoreline in areas routinely covered by seawater, this will be left to disperse naturally over the tidal cycle."*

The mitigation measures outlined above are remediation measures and cannot be considered mitigation. Once a spill occurs the damage is immediate and there is no time to mitigate. Bentonite although not toxic will sink and create a sediment layer over the estuary and its qualifying interests (mudflats/ salt-marsh etc.) and smother and kill any aquatic life that cannot avoid the spill. This would include smaller fish and invertebrates. Depending on the level of breakout, oxygen levels in the water will also deplete to the point of killing marine life. It would not be possible to immediately clear the breakout to prevent the loss of aquatic life. "Mitigation" would merely involve a remediation operation by trying to clear/ collect the bentonite. Such a remediation operation in itself would incur significant disturbance and damage to designated SCI's for Baldoyle Bay including plant, bird insect and animal life in the estuary, in addition to a depletion of food sources. Once Baldoyle Bay Estuary's ecosystem has been impacted by a bentonite pollution event it cannot be re-mediated to its baseline state. In fact depending on the extent of the bentonite pollution event it could take years for the Conservation area to return to its baseline state naturally. Therefore when a bentonite spill occurs in the mitigation hierarchy the scenario will be one of compensating measures not mitigation or "intervention" as the applicant claims.

Once compensatory measures rather than mitigation measures become the only option then under the Habitats Directive Article 6(4) is triggered. Under the IROPI a project can only be given derogation if there are no other alternatives. This application can not be granted under article 6.4 of the Habitats directive as there are alternative solutions. The Clonshaugh site for the Waste Water treatment plant as part of this application was one of three sites chosen during the Alternative Site Selection stage 4 for the Greater Dublin Drainage Project. The three sites were chosen based primarily on economic grounds. The phase 4 report on preferred site selection states: *"The ASA Phase 4 process has determined that it is technically feasible to construct all three site options. However, it was identified that all site options have, to varying degrees, 'less favourable' classification under the range of Environmental, Technical and Cost criteria considered." It further states that; "The landfall area of the northern outfall location is considered to have less ecological sensitivity in comparison to the landfall area of southern outfall location." And "Under Cost criteria preliminary cost estimates indicate that the substantially lowest and therefore 'more favourable' cost is associated with the Clonshaugh site option."* These statements confirm that this project could feasibly have been built on two other sites Annsbrook and Newtowncorduff but at a higher capital expense. Both of these sites would have used the Northern outfall and so would not have required tunnelling under Baldoyle Estuary SAC risking a bentonite pollution event.

There are a number of environmental concerns associated with the use of Bentonite as a drilling fluid. The potential impact of Bentonite pollution cannot be discounted even when a developer has all the geological surveys in place to support their application. However contrary to their assertions above regarding detailed investigative geological surveys, no bore hole samples were taken on any section of the pipeline route that spans the Estuary. This in itself casts substantial doubt on the accuracy of the information relied upon to discount the possibility of a breakout. Further risk also exists in terms of a geological fold line in close proximity to the tunnelled pipeline route under Baldoyle Estuary. A fold is a bend in the rock strata. The term fold is used in geology when one or a stack of originally flat, level surfaces, such as sedimentary strata are bent or curved as a result of pressure and high temperature. The basic cause is likely to be some aspect of plate tectonics. When two forces act towards each other from opposite sides, rock layers are bent into *folds*. An upward fold is called an anticline, while a downward fold is called a syncline.

The fold is not discussed or mentioned anywhere in the NIS or application although it does appear on map 3 of 3 in chapter 18 of the EIAR. I did raise the issue of the fold and had to hand a copy of a thesis document referenced INF-11-03-CHE funded by Infomar and available on their website which related to investigation of Dublin bays geology in order to inform the route of the Ringsend long sea outfall. Page 137 of the Document illustrates the location of the Baldoyle fold and the key for the fold line indicated that it is a strike for vertical foliations. I raised this issue at the oral hearing which the Inspector addresses as follows. On page 393 of her report: *Mr Eoin Wyse (OH-73) responded to Ms Joyce-Kemper's statement that there was inadequate information relating to the geological conditions under Baldoyle Bay. Mr Wyse noted that ground models would always be based on numerous sources and by examining existing landforms a robust model can be developed. Specific investigations undertaken were described. He also noted that the INFOMAR data set had been consulted and referring to Figure 18.2 Sheet 3 of 3 of the EIAR he noted that there is an anticlinal fold running south-east – north-east (not a fault as Ms Joyce Kemper had stated) and would not have implications for tunnelling in the area.* ***A fault would have implications****. Mr O'Keeffe noted that the fold can be tunnelled through. A fault does exist he stated as previously referred to and which is just west of Ireland's Eye – that fault had not been clearly defined previously but was defined in the site investigations. Mr Wyse stated that the fault was identified in the borehole and in the geophysical investigations and it lead to the avoidance of tunnelling in the area. Mr O'Keeffe noted that the fault would extend to the north and south but not east to west. (Day 6-13.12).*

Having reviewed the documents and Report we did notice that a fault has been identified in borehole samples for the subsurface of compound 10. see Appendix drawing bundle .

This identification of a sample that indicates a fault is particularly concerning as it does not appear to have been addressed by applicant, inspector or Board. As Mr O'Keefe said a fault would have implications for tunnelling in the area. We also note that Borehole 136 sample analysis not not appear in the reports that we can see.

As previously mentioned we pointed out the deficiency of scientific information in the form of surveys of the subsurface under Baldoyle estuary. IT appears the we were not the only people who required more information as on the 16th of January 2020 Irish Water applied for foreshore consent under application reference FS 007093 See appendix .

This new foreshore licence was specifically to carry out "non intrusive" surveys within Baldoyle BAY SAC along the proposed pipe route. The application states that *the purpose of the marine geophysical investigation is to map the type and thickness of the sediments layers, determine sediment thickness, map the depth to bedrock, map variation in bedrock type and rok quality and determine engineering parameters survey.*

We put it to the Board and Irish Water that these surveys should be informing the EIAR and AA and associated risk assessment in terms of Tunnel Boring and bentonite breakout. No decision should be made on the potential risks to the Baldoyle Bay SAC until all precise and scientific information has been collated and assessed appropriately. In the aforementioned appendix we note from the emails that Irish Water were informed that the application would have to go through a full foreshore consenting process including public consultation. It appears that upon being advised of this Irish Water decided against continuing with the application and withdrew it soon after.

> While Mr Wyse in his reply stated that the fold could be tunnelled through, he did not comment on whether the fold would complicate the tunnel boring process. In their reasons and considerations on page 11 para. 3 of the order, The Board give the opinion that, *"Air surface venting or bentonite breakout associated with tunnelling under the Baldoyle Bay Spacial Area of Conservation (site code: 000199) would impact saltmarsh on a very small area for a short duration."* They admit the impact but cannot negate it by suggesting mitigation, as there is no mitigation possible. They also imply that the impact would be small and for a short duration, which is an opinion that was based on no tangible evidence before the Board. on the part of the Board, as there is no scientific basis via modelling or reports to substantiate the Boards claim. However in my first submission I was able to give an account of a pollution event in the Marys river in the united states which took 2 weeks to remediate, but caused immediate damage to the freshwater species. Once the bentonite smothers flora and fauna there is no bringing them back from the dead via "remediation". Such communities could take years to return to the same abundance if at all. Baldoyle Bay is already under pressure in terms of losses of Eel grass (food source for Light Bellied Brent Geese) and benthic communities, and other organism that feed protected species higher up the trophic food chain. A bentonite breakout would severely hamper this and there is no evidence before the board modelling how quickly the inert substance would flush out if at all.
>
> There are numerous examples listed below of incidents that involve tunnel boring and a bentonite breakout, or indeed the other terminology for such a pollution event that at the time I was unaware of as it was not mentioned as a risk in the CEMP; inadvertent return of the Bentonite drilling fluid

where the drilling fluid under pressure finds the path of least resistance and can move in any direction usually towards a water body. The construction compounds where the tunnel boring begins and ends are less than 20 metres from the protected wetlands and compound No. 9 is on an uphill gradient from the Estuary and 30 metres from the Mayne River which feeds into Baldoyle Bay/Wetlands.

The previously mentioned Mary's River bentonite pollution event happened despite assurances at planning stage that it was an extremely unlikely event. The Environment officer for the Gas pipeline company a Mr. Hayward stated after the fact *"the pipeline route had been investigated in advance using vertical bores to sample soil types and compaction levels"*, but he also noted *"that it was impossible to know exactly what conditions exist deep beneath the surface. In many parts of the route, the bore hole for the new 12-inch pipe is 50 to 100 feet underground."* That pipe was only 12 inches the Greater Dublin Drainage Project marine based pipeline is internally 2 metres and externally up to 2.5 metres (Irish water are not sure as the OCEMP is only outline and final details will be up to the DBO contractor).

In April 2017 while tunnelling the Rover Pipeline in Ohio, a contractor released two spills into the environment. The larger spill coated 500,000 square feet of a wetland adjacent to the Tuscarawas River in north-east Ohio with as much as 2 million gallons of bentonite mud .An additional 50,000 gallons of bentonite spilled into a wetland in Mifflin Township in Richland County. As construction progressed, small amounts of clay mud had surfaced for weeks, according to the Ohio EPA. The company had been pumping the material back into its rig until a pump failed on April 14, releasing bentonite across three-quarters of an acre of wetland. In another actual pollution event example in May 2017 the pipeline construction of Sunoco's Mariner East 2 had caused three separate releases of drilling mud in May, with two incidents resulting in a combined total of 575 gallons of bentonite clay entering Chester Creek in Brookhaven, Delaware County.

Neither The Applicant or The Board can guarantee that such an event will not take place even if they follow the OCEMP. As such under the precautionary principal the potential risk of such an event within the actual SAC area, which would result in a compensatory scenario under the article 6(4) of the Habitats Directive, would disallow granting of permission for the application. The Inspector states on page 4 of her report that even in the event of a small breakout there would be *"Minor Impact Significance due to the ecological value of the salt-marsh habitat".* The salt marsh habitat is a Special Conservation Interest of Baldoyle BAY SAC and so is of extremely high ecological value contrary to what the Inspector says. The Inspector makes a number of statements in her report on bentonite breakout and concludes as follows on page 265 *"My consideration of the matter of bentonite breakout is as follows. I accept the point that the depth of the route below the estuary further reduces the likelihood of a bentonite breakout affecting the qualifying interests. I also consider that if there is a breakout in the channel or open water the material will disperse harmlessly and if it occurred within salt marsh vegetation then mitigation as presented in the NIS (localised treatment) would be sufficient to ensure no significant adverse impacts on the salt-marsh habitat. The material is viscous and should therefore be easily contained. I concur with the conclusion in the NIS that the qualifying interest and conservation of community type in a natural condition will not be impacted by any likely pollution events including bentonite breakout"*

The inspector makes an unsupported assumption by stating that she believes a breakout will disperse harmlessly. She does not explain how she reached this conclusion after hearing from both sides of the application, that a breakout will result in damage to plant life and marine life. Localised treatment which is only described as "clean up" without any procedures involved being identified will just have further significant impacts on the protected estuary as it would involve physical human intervention. I must reiterate that this is not mitigation it is compensatory remediation and therefore cannot be considered under Article 6 of the Habitats Directive. At the time of the adoption of the decision we have a superposition of two scenarios, bentonite will blow out or won't blow out. If it doesn't, no harm done, but if it does it cannot be prevented. Under the Precautionary Principle, if there is any scientific doubt a project must be refused. In this case there is a substantial amount of scientific doubt, due to there being no geological surveys of the whole tunnel route under the Baldoyle Bay estuary combined with the unknown quantity of a geological fold caused by historical tectonic pressure, and the applicants admission in the NIS that "*the risk of a surface breakout by bentonite drilling fluid cannot be negated completely due to variability in the underlying geology.*"

Reliance on future mitigation measures in order to address any potential LSE is improper: a decision is unlawful if any reasonable scientific doubt exists at the time it is made. In Commission v Portugal C-239/04 (at para. 24) the Court (again approving A. G. Kokott's Opinion) stated: "*The fact that, after its completion, the project may not have produced such effects is immaterial to that assessment. It is at the time of adoption of the decision authorising implementation of the project that there must be no reasonable scientific doubt remaining as to the absence of adverse effects on the integrity of the site in question (see, to that effect, Case C-209/02 Commission v Austria [2004] ECR I1211, paragraphs 26 and 27, and Waddenvereniging and Vogelbeschermingsvereniging, paragraphs 56 and 59).*"

Air breakout Impacts on Baldoyle Bay SAC; in addition to Bentonite pollution, depressions caused by tunnel boring will have a serious negative impact on Baldoyle Bay estuary SAC and its qualifying interests. Page 264 of Inspector's report states: *The evidence was that there were no bentonite breakouts at the Corrib tunnel which was a longer and larger structure. The observers commented on air breakouts which were recorded and the response of Irish Water referred to the greater surface area and the highly pressurised nature of the tunnel at Corrib. Depressions did occur at Corrib during tunnelling sand. There is potential for air breakout as a result of tunnelling but habitat impacts be very small. Changes to the channel are considered extremely unlikely and almost impossible and as an estuary it is constantly mobile and the ecological functions would not be changed and certainly there would not be damage to sediments so as to affect the conservation objectives.*"

The Corrib pipeline was externally 4.2 metres in diameter with an internal diameter of 3.5 metres.. The Baldoyle Bay estuary marine outfall pipeline will be approximately, externally 2.4m in diameter with an internal diameter of 2 metres. The depressions that occurred in Sruwaddacon Bay, Co. Mayo were substantial but luckily the damage was minimal because they occurred in a bay in deeper waters with less sensitive habitats, not in an estuary which is also a wetland largely made up of protected mudflats, marsh and meadows with a large serpentine channel running through it.

According to the Consent Conditions Compliance Monitoring Report 17: 29th June 2013 to 6th September 2013 for the Corrib project: the first three inspected depressions *"were around 3-4m in diameter with a maximum depth of approximately 0.3m (i.e. just below the top of a Wellington boot). At the time of the site visit it was approximately 2 weeks since the last depression had been formed. Therefore, the depressions would have been washed over by a number of tides by the time of observation and it is likely that they were deeper when they first appeared. No evidence of contamination (e.g. discolouration of sand or water) was apparent. In addition to the depressions noted above, a vaguely defined linear depression was also present along the line of the tunnel about 1,000m from Aughoose (Photo 5). This was very shallow (approximately 0.05m deep), approximately 40m long and 7m wide. It is understood that this resulted from settlement of the soil above the tunnel. SEPIL has manually raked sand to form low berms (approximately 0.15m high) across the width of this feature to prevent water draining along it during an outgoing tide".Video footage of a newly formed depression taken on the 19th July 2013 (the day after ENVIRON's visit) indicates that it was in excess of 1m deep in a small area at its centre. This suggests that natural processes can infill depressions relatively rapidly after formation (i.e. decreasing the depth from 1m or more to around 0.3m within a two week period).*

The engineers for the Corrib project, Environ did not visit the site until two weeks after the air breakout caused the subsidence of the sands. Video footage shot by locals (https://www.thejournal.ie/sinkholes-mayo-shell-to-sea-993785-Jul2013/) show some of the depressions forming and the concerning sight of thousands of bubbles breaking through the surface. According to the report an air breakout occurred every time the Tunnel Boring Machine (TBM) had intervention maintenance in order to change the cutter. This was 16 times and the contractor BAM confirmed that an air breakout occurred in each case. While the report confirms that no bentonite **surface** breakout occurred it makes no comment on inadvertent returns in the substrate.

The above report confirms that there is an extreme likelihood of air breakout occurring at the marine based outfall section of the Greater Dublin Drainage Project, every time maintenance intervention is required. However, despite me providing proof that significant negative impact exists based on precedence in the Corrib case, without any scientific supporting evidence from The Applicant, the Inspector and therefore the Board accepted The Applicant Irish Waters, verbal assurances that no maintenance would be required during the 6-8 months marine based outfall tunnelling phase of the project and that air breakout would be unlikely. These assurances had no scientific basis and it is impossible to guarantee that a Tunnel Boring Machine will not require maintenance at its cutting face nor will its other mechanical parts. In fact this assertion seems to contradict all health and safety protocols for heavy machinery maintenance which is not compatible will their response, a response which was accepted by the inspector as proof of no risk and has no grounding in common sense.

In Peter Sweetman, Ireland, Attorney General, Minister for the Environment, Heritage and Local Government v An Bord Pleanála C-258/11, the correct application of the aforementioned provisions was summarised by the Court: *"40. Authorisation for a plan or project, as referred to in Article 6(3) of the Habitats Directive, may therefore be given only on condition that the competent authorities - once all aspects of the plan or project have been identified which can, by themselves or in*

combination with other plans or projects, affect the conservation objectives of the site concerned, and in the light of the best scientific knowledge in the field - are certain that the plan or project will not have lasting adverse effects on the integrity of that site. That is so where no reasonable scientific doubt remains as to the absence of such effects (see, to this effect, Case C404/09 Commission v Spain, paragraph 99, and Solvay and Others, paragraph 67).

18. Tunnell Bore Brief of evidence

At this point I would like to refer the inspector and the board to a brief of evidence that was submitted at the oral hearing although it was not put up on the stand alone website under the Oral Hearing Section. The document is entitled "brief of evidence tunnell boring by Tim Jaguttis. As the oral hearing agenda did not list this individual we decided to contact him. Mr Jaguttiss confirmed that he had never heard of the GDDP project and was not aware that his bried has been entered into evidence as part of the Planning Application for it. I have attached at appendix the email thread of our correspondence in full email address redacted confirming this. As this evidence was not entered into the record by an expert at the oral hearing we ask that the reliance put on it and its contents by the Inspector and the Board who accepted the Report be disregarded.

19. Harbour Porpoise.

Rockabill to Dalkey SAC; The Greater Dublin Drainage Project (GDDP) marine based outfall discharges directly into the Rockabill to Dalkey SAC of which a Special Conservation Interest is the Harbour Porpoise *Phocoena phocoena*. The applicant's surveys identified that the most sightings of these cetaceans were in Dublin Bay just off Howth Head. The reason for this is that this area is deeper than the majority of Dublin Bay and forms a Bowl or sink like shape with sea banks on all sides. The depth of this "sink" was the reason The Applicant Irish Water chose this location for the diffuser, in order to disperse the sewage effluent in deeper waters. This decision was counter intuitive though as it effectively means that Irish Water will be pumping effluent over a sand ridge, into waters which are hemmed in on all sides by banks (Bedford Bank and the shallow Bed of Dublin Bay) forming this sink like effect, and these waters are the area where harbour porpoises are most sighted. In my first submission I raised the issue of the impact that bioaccumulation of pathogens, chemicals, toxins and hard metals would have on the harbour porpoise. I also raised my concerns again at the oral hearing. In their response to submissions dated January 2019 The Applicant did not even acknowledge my concern despite the harbour porpoise being an SCI of the Rockabill to Dalkey SAC that they will be pumping sewage effluent directly into.

I also referenced scientific data published by the Canadian government, however The Applicant made no attempt to rebut the scientific claims I put forward about pathogen/ disease infection via sewage effluent and bioaccumulation of pharmaceuticals, and hard metals in these mammals. An excerpt from my submission reads as follows: "*The final impact on the harbour porpoise will take effect during the operational phase. When the outfall pipe is pumping secondary treated effluent into unusually shallow waters off Portmarnock beach, a popular bathing spot. See Figure 10. which clearly illustrates how the depth of the area where the outfall pipe is located, only just falls into the 15-10 metre bracket just before the outfall diffusion point. Most of the area is in 5-10 metre depth and the remaining area is exposed during low tide.*"

I went on to say; "Harbour porpoise are exceptionally susceptible to sewage pollution. According to research undertaken by the Canadian Federal governments environmental section, marine contamination is a serious threat to population levels; "*Contamination can occur in the form of marine debris, anthropogenic biological pollutants (e.g. sewage outflow) or via chemical contamination of habitat or prey. Harbour porpoise have been known to ingest plastic debris, and in some cases, this has resulted in death (Baird and Hooker 2000). Small cetaceans lack the metabolic capacity to degrade or excrete pollutants and thus retain high quantities in their systems (Tanabe et al. 1988). These pollutants may increase the risk of immunosuppression (Hall et al. 2005), and potentially reduce reproductive capabilities and neonate survival. The historical and emerging effects of marine contamination from polluting activities on harbour porpoise populations are uncertain, though given the likelihood of localized hotspots of contamination in harbour porpoise habitat, this threat is rated at medium to high level of concern. Regulations and monitoring of point sources of contamination can alleviate some concern for this threat; however, long-term chronic exposure to pollutants (both regulated and unregulated) creates uncertainty regarding effects to long-term reproductive health of this population. Biological pollution may occur in the form of nutrient-loading, hormones and antibiotic contamination entering the marine environment via sewage outflow, agricultural and other sources. Introduction of foreign diseases into a population of highly social cetaceans may result in disease outbreaks leading to population decline (Guimarés et al. 2007). As there is some suggestion that harbour porpoise may have a polygynandrous mating system (Grier and Burk 1992), they may be vulnerable to outbreaks of highly contagious diseases. As occurrence of disease may be the result of natural pathogens in the environment, or from anthropogenic nutrient-loading or introduction of foreign pathogens, sources of biological pollutants should be assessed and monitored to effect adequate mitigation of those anthropogenic threats. Exposures to contagions or other biological pollution may lead to negative synergistic effects with other stresses.*"

In the intervening years since the application was lodged in 2018 there have been further concerning developments in relation to cetaceans. A recent scientific paper see Appendix bundle attached has identified that cetaceans are succumbing to freshwater wasting disease. This causes legions on the skin which can then be infected by pollutants in the water.

As I demonstrated at submission stage, there is a massive amount of scientific research that concludes that marine mammals such as Harbour Porpoise *Phocoena phocoena* and other protected marine mammals such as Grey Seals *Halichoerus grypus* are particularly susceptible to bioaccumulation of PCBs, persistent Organic Pollutants (POPs) and hard metals in their blubber. The concentrated toxic load in their bodies has the effect of reducing reproductive capability and when young calves are born, their mothers body inadvertently detoxifies by diverting her toxins to her baby through her milk. See appendix . The bioaccumulation in adult porpoises occurs due to direct contact with sewage effluent in marine waters, via dredging of seabed that has accumulated metals, chemicals, and toxins in its sediments particularly near outfalls, city rivers mouths and harbours. The harbour porpoises also consume fish and invertebrates that have come into contact with PCBs and POPs through feeding at sewage outfalls or bottom feeding on seabed or on dredged suspended solids. This results in additional contamination for porpoises and seals as they are at the top of this food chain. There is an abundance of reports and information in support of my claim. Harbour porpoises as mammals are also extremely susceptible to infection from pathogens. There

has been frequent mass mortality amongst harbour seals and harbour porpoises caused by virus outbreak most notably in 2007 **(***Mass mortality in harbour seals and harbour porpoises caused by an unknown pathogen T. Harkonen, B. M. Bäcklin, T. Barrett, A. Bergman, M. Corteyn, R. Dietz, K. C. Harding, J. Malmsten, A. Roos, J. Teilmann*).

Due to potential conflict of interest from the IWDG we contacted ASOBANS for information on assessment of impacts on Harbour Porpoise to include:

-Virus load that could infect porpoise
-large Freshwater load containing bacteria and pathogen which could cause freshwater skin disease and associated deficiencies in in cetacean immune systems
-Temperature changes from 20 degree Celsius water in otherwise normal sea temps.
-Desalination of the habitats
-Microplastic contamination
-Bioaccumulation of PCBs which pass to young calves in milk in toxic amounts.
-Sediment dispersion disturbance

ASCOBANS sent a number of their reports (appendix Bundle) listed below, as examples of how a robust assessment of risk and threats to the harbour porpoise should be carried out. When Irish Water have completed a full assessment, they have agreed that I will send to them for expert comment.

Even though Ireland is not a Range State to the ASCOBANS harbour porpoise action plans, we would like to refer you to these documents in general:

The North Sea Plan, esp. Table 2 'Approximate distribution and scale of human uses in the North Sea in relation to the notional harbour porpoise sub-populations' and Table 3 'Summary of information of actual and potential threats to harbour porpoises in the North Sea area'
Jastarnia Plan, esp. section 5.1 on threats
Western Baltic Conservation Plan, esp. section 3.7 on threats

Unfortunately we were not able to compile a summary, as we are preparing for the 27th Meeting of the Advisory Committee, taking place this week.

Regarding noise impacts, the following CMS documents may be useful (Ireland is a Party to CMS):
CMS Resolution 12.14 Adverse Impacts of Anthropogenic Noise on Cetaceans and Other Migratory Species
CMS Family Guidelines on Environmental Impact Assessment for Marine Noise Generating Activities (Annex 1 to Resolution 12.14)
Technical Support Information

20. Addition of UV treatment and Efficacy of same:

UV treatment is not 100% effective at neutralising pathogens and bacterial disease, in fact even the Environmental Protection Agency (EPA) sponsored reports put effectiveness at about 60-80% due to the numerous complications with the UV process within a wastewater treatment plant. There is also the issue that Ireland's largest wastewater treatment, the Ringsend Wastewater Treatment plant at an eventual 2.4 million PE is already discharging into the Rockabill to Dalkey SAC. Another major contributing factor is that due to the positioning of the Howth peninsula already the polluted waters of Dublin bay are prevented by tidal movements and currents from impacting on Portmarnock beach, as badly as Ringsend impacts on Dollymount Beach, which provides a rare habitat of water off Portmarnock that is at excellent quality for bathers with a blue flag status. Humans just swim in the sea recreationally, cetaceans (harbour porpoise) live in it. Putting a sewage outfall in this area with 500,000PE – 800,000PE of sewage effluent pumping into pristine waters will only degrade the harbour porpoises supporting habitats, that the Rockabill to Dalkey SAC was designated for. Ireland's two largest wastewater treatment plants will discharge into a protected habitat and UNESCO biosphere within a 20km stretch of each other. There is no doubt that there will be a further degrading of the marine environment if the second largest waste water treatment plant in the country discharges its sewage effluent in the same coastal waters as the

The impact of the sewage discharge which will contain hospital effluent, abattoir effluent and significant industrial effluent, discharging into the centre of a designated conservation area one of only three safe zones designated for the protection of harbour porpoise in Ireland, can only be substantial. As mammals Harbour porpoise will additionally be impacted by Pathogens and endocrine disrupters. Just one virus event could wipe out whole communities of porpoise due to the social nature of the species. Absolutely no assessment of this impact on the Special Conservation Interest has been carried out either by the Applicant or the Board despite Scientific proof being presented in support of the serious impacts on the species. As the Board did not discount the scientific basis of the significant impacts nor did they even acknowledge the impacts of PCBs Pathogens, Pop's and endocrine disrupters of the Harbour Porpoise appropriate assessment of this impact was not undertaken by the Board. We MUST also be cognisant of issues surround COVID, emerging virus and Zoonosis with sewage effluent containing such virus and the potential for infection of Marine Mammals with the surcharge taking place within their protected habitat.

21. Microplastics

Microplastics is a recognised and substantial current impact on the Marine environment. This impact was not assessed at all by the Applicant nor was it assessed by the Inspector and therefore the Board. The issue of microplastics which was raised at submission stage (Portmarnock Beach Committee). The Applicant Irish Water reply in their response document of January 2019 was as follows; *903. The Irish Government invited Public Consultation on the 'General Scheme of the Prohibition of Certain Products Containing Plastic Micro beads Bill 2018' in November 2018. In their submission to the invitation for public consultation the Applicant welcomed the proposals to prohibit the manufacture, import, export, supply, sale or exposure for sale of certain products that contain plastic micro beads and to provide for the safe disposal of waste products containing plastic micro beads. 904. Irish Water is supportive of the approach to address the micro beads issue at source*

rather than by way of end of pipe treatment as it is neither practically nor economically feasible to remove plastic micro beads during water or waste water treatment.

The Applicant Irish Water did not actually respond to the issue of microplastics only to the issue of micro beads. However, micro plastics which are being found worldwide in the stomach and digestive tracts of fish and marine mammals are contained in all wastewater discharges and point source pollution is the main pathway receptor into the Marine Environment. As Irish Water have confirmed above microplastics cannot be removed during wastewater treatment. Two classifications of micro plastics currently exist. Primary micro plastics are any plastic fragments or particles that are already 5.0mm in size or less before entering the environment. These include microfibres from clothing, microbeads, and plastic pellets (also known as nurdles). Secondary micro plastics are micro plastics that are created from the degradation of larger plastic products once they enter the environment through natural weathering processes. Such sources of secondary micro plastics (which could be considered a cumulative impact) include water and soda bottles, fishing nets, and plastic bags. Both types are recognized to persist in the environment at high levels, particularly in aquatic and marine ecosystems. Such plastics degrade slowly, often over hundreds if not thousands of years. This increases the probability of micro plastics being ingested and incorporated into, and accumulated in, the bodies and tissues of many organisms.

One of the greatest effects of micro plastics in the marine environment is given by their bioavailability to organisms throughout the food web (Chua et al., 2014;Cole et al., 2011;Lee et al., 2019;Sun et al., 2018;Zhu et al., 2019) and, therefore, by the possible transfer of persistent organic pollutants that are retained onto their surface or to the leaching of additives already included in their manufacture process (Camacho et al., 2019;Carbery et al., 2018;Gallo et al., 2018;Rodrigues et al., 2019;Taniguchi et al., 2016;Teuten et al., 2009;Wang et al., 2018).

Plastics additives such as phthalates, UV stabilizers, colourants, brominated flame retardants, and bisphenol A are pollutants of particular concern (Thompson et al., 2009). Mato et al. (2001) reported that micro plastics are able to accumulate PAHs, PCBs, phthalates, and pesticides with a concentration factor of up to 10^6 times compared to surrounding seawater; a similar finding has been pointed out by Rodrigues et al. (2018), who have highlighted the possible transfer of pollutants to the biota. PCBs and PBDEs found in fish fed with the marine plastic than those fed with the virgin plastic (Rochman et al., 2013) indicated that plastic debris serves as a vector for the absorbed pollutants to wildlife.

A report by the World Health Organisation (WHO) found that micro plastics in wastewater networks can act as transporters of infectious disease. The documents state the following: *Although limited, current evidence suggests that micro plastics may be able to transport and disperse plastisphere communities over long distances. For example, micro plastics released from WWTPs may enable transport of sewage-related microorganisms in the effluent for long distances (McCormick et al. 2016; Oberbeckmann, Kreikemeyer, and Labrenz, 2018). Micro plastics may also serve as vectors for harmful organisms, including enteric viruses and protozoa, as these organisms can accumulate in biofilms, harbour other pathogens and remain infectious in the plastisphere (Atanasova et al., 2018; Sun et al., 2018). A study conducted in nine rivers in Illinois, USA, found higher presence of*

Pseudomonas spp., Burkholderiales incertae sedis, and Campylobacteraceae on micro plastics than on other suspended matter or in water (McCormick et al., 2016).

There is an abundance of evidence that due to their large specific surface area and hydrophobic surface, persistent organic pollutants, metals and pathogens could be easily adsorbed on the surface of micro plastics. The micro plastic remain suspended in the seawater where they have discharged where they are ingested by fish and micro sea life, who in turn are ingested by birds and marine mammals. There is ls also some discussion as to whether micro plastics interfere with the efficacy of UV treatment as they can absorb high amounts of UV radiation thus making UV treatment in drinking and wastewater treatment plants less effective.

The Applicant Identified no impact and therefore assessment of ingestion of microplastic on marine mammals including the SCIs of Rockabill to Dalkey SAC in the EIAR or NIS. Despite observers raising these issues which the Inspector notes on page XXX of her report which states *"There is also concern relating to chemicals, micro plastics, viruses and hormones."* she never assesses the impact. Therefore, it was irrational to make a determination without assessing one of the biggest current threats to marine life, particularly a Special Conservation Interest of the Rockabill to Dalkey SAC which the sewage outfall discharges directly into. We are not asking that the court assess the impacts of Microplastics on the environment, but we do ask that they quash the grant of permission so that the Board can appropriately assess this previously highlighted but ignore impact.

22. Bioaccumulation of Microplastics in Nephrops.

Sewage and its dangerous components do not magically disappear, it disperses and solids containing hard metals etc. fall to the seabed. There are also issues with the flushing out capabilities of A) Dublin Bay and B) The Irish Sea, which can take up to 600 days to flush through in parts. A seasonal anomaly called the Western Irish Sea Gyre which starts just east of Lambay Island and ends up north cause the same waters to circulate in situ.

The issue of poor circulation in the Irish sea is such a concern that authors of Marine Pollution Bulletin 2010, 60: 748-758 Dabrowski, T,Hartnett, M,Olbert, AI (2010) 'Influence of seasonal circulation on flushing of the Irish Sea'. say *t"hat due to a number of features of the western Irish sea, Irish Baroclinic circulation induced by such features may prove to have very significant effects on retention times of all pollutants and other constituents that are carried with water, indicating that careful management approach needs to be adopted".* The report also states that; *"Detailed analysis of the stratified region of the western Irish Sea revealed that intra- annual variation in the values of residence times in this region is very significant; for example, the material introduced into the region in December is likely to remain there for the time period five times greater than the material that entered the region in October. The results also indicate that the cyclonic density-driven gyre developing in the western Irish Sea over the heating season causes a two-fold increase in the value of residence time of the region".*

This report highlights that the area where the proposed Greater Dublin Drainage Project outfall will discharge is subject to poor flushing and that the waters in this area if they contained sewage

effluent and contaminated micro plastics would have a longer circulation time than other areas along the Irish coast. The fact that the Inspector chose not to address this issue of pathogen impacts, bioaccumulation of PCBs and effects of pharmaceuticals on marine mammals defies logic and does not seem rational. Lacunae exist that were highlighted to the Inspector and were highlighted in submissions. These lacunae were not dealt with, as such The Board failed to appropriately assess the Project. The Board should not have granted permission when a significant impact identified was not assessed under stage two assessment, was not addressed in the EIAR or NIS and no response was given by either The Applicant nor the Inspector when the issue was raised in writing and verbally. Supporting Case law: Habitats directive – Lacunae ruling not definitive. Guilfoyle ruling

The western Irish Seaa Gyre also supports one of the largest production areas for Nephrophs or dublin bay prawns. This production area crosses the boarder into Northern Irish Waters. Impacts of effluent on nephrophs hormonal development, bioaccumulation of toxins and microplastics on this important commercial species must be assessed, We also belive that a trans Boundary consultation should take place on this issue due to its impact on Northern Irish Fishers and companies.

23. Light Bellied Brent Geese (LBBG):

Impacts on Baldoyle Special Area of Protection and its qualifying interests. In the Portmarnock South LAP a large area of land identified as feeding habitat for Brent Geese and other SCI's for Baldoyle SPA was rezoned for residential development. In order to mitigate (in my opinion compensate) for this impact Fingal County Council designated an area of the same tranche of land just on the opposite side of the rezoned residential land as a quiet zone for feeding and roosting wetland birds during high tide, most notably Lapwing and Light bellied Brent geese. A buffer zone along the coast road was also identified within the same lands in order to allow a transitional area for birds from the SPA to use during high tide. In the Baldoyle Bay SPA conservation objectives, one of the biggest disturbances to water birds and protected species was dogs and dog walkers to this end the quiet zone was fenced off to provide a stable and safe feeding and roosting zone.

In order to construct the trench less outfall section of the pipeline, The Applicant propose commandeering and developing a sizeable area of grassland/bird habitat on each side of the Baldoyle Estuary SAC. This habitat will be hard landscaped into construction compounds for the duration of the project. Compound 9 will occupy the already designated ex situ feeding site for Brent Geese, it will also take the arable land designated to lapwing for the access road and the trench corridor will take up the rest of the designated land. This exact site where they want to put the Tunnel Boring Machine in compound 9, has been used as mitigation for habitat loss in Natura Impact Statements attached to developments and projects not once but five times (Portmarnock South LAP, Portmarnock South Phase 1A, Phase 1B and Phase 1C and Baldoyle to Portmarnock Cycleway). So, the Maynetown area which has been identified by Dillion and Pierce as being interdependent with Baldoyle Bay SPA has had five projects / developments within the footprint of the land which all used the same mitigation in the form of the Lapwing/ Brent geese quiet zone. We are really seeing "death of a thousand cuts" in this important ex situ site.

Irish Water has tried to diminish the value of these sites in particular the Ex Situ feeding site at compound 9. These sites are interdependent with the SAC and have been for decades. On numerous NIS for nearby developments the areas around compound nine have been mapped as feeding sites for Light bellied Brent Geese. Fingal County Councils Baldoyle to Portmarnock cycle route application identifies this area as a designated feeding site for light bellied Brent geese as does the Ecological Study of the Coastal Habitats in County Fingal Phase II – Birds (Figure 7), also commissioned by Fingal County Council. Another report (Figure 8) for Portmarnock south LAP NIS also commissioned by Fingal County Council identifies the same area as a feeding site for a number of qualifying species for the SPA. The Portmarnock Lap quotes: *"Informal consultation was also undertaken with Irish Brent Goose Research Group regarding lands to the south of the LAP area (Baldoyle-Stapolin) and the Portmarnock South LAP lands. It was noted that the LAP lands used by Brent geese is dependent on whether, and where, winter cereals have been planted, with the geese being attracted to winter cereals. It was noted that this was not the case during the 2012/2013 winter, in the past large numbers (1000+) have been observed, particularly in the field which slopes up from the coast road within the east of the LAP lands. (pers. comm., Re sightings Co-ordinator, Irish Brent Goose Research Group, 2013").*

The same report identifies main pressures and threats to Light bellied Brent geese habitats as the following: Habitat loss/degradation (human induced) – agriculture, infrastructural development, human settlement, tourism, recreation, dams, invasive species; accidental mortality – collision; persecution; pollution – global warming, sea level rise, water pollution; natural disasters – drought, storms, flooding; changes in native species dynamics – competitors, pathogens/parasites; poor regeneration, restricted range; human disturbance – recreation, transport, agricultural, industrial. Excluding dams and persecution every single one of those threats identified will be the reality if this development goes ahead.

The Portmarnock South Lap NIS in same report also states: *Bird species of Baldoyle Bay SPA, in particular Light-bellied Brent Geese are known to use lands surrounding the SPA for feeding. A section of the agricultural lands adjoining the SPA, in the vicinity of C4 were noted to be of major importance with records of between 401-1450 Light bellied Brent Geese recorded from this area (Benson, 2009). Loss of feeding habitat may result in negative impacts upon qualifying interests of the SPA*." Finally, the Portmarnock South Area Lap NIS concludes: *Once mitigation has been implemented in full, no decrease in favourable conservation status of Brent Geese are predicted and no significant impacts to Baldoyle SPA site integrity will arise as a result of loss of feeding habitat. This assessment has taken account of best available scientific information including a) current and historical Brent data for the fields in question, b) increasing national and local Brent Geese populations c) the species is not red-listed nationally, and d) taking account of mitigation measures including seasonal fencing and management measures of fields to the east and south of the LAP lands for wintering bird species including provision of a quiet zone.*

It has been ascertained that there is a wealth of documented references to the area where compound 9 is planned for, being an ex situ feeding site to not only Brent geese but qualifying species for other SAC's in Dublin. It is therefore integral to maintaining the favourable conservation

status of Baldoyle Bay SAC/ SPA in the first instance but also represents an important feeding site that contributes to maintaining a cohesive overall Natura 2000 network for the Dublin area.

The fields adjacent to Baldoyle Bay SAC constitute part of the SAC habitat by virtue of their role as an extremely important terrestrial feeding site for Light-Bellied Brent Geese. Over a thousand geese have been documented feeding here at one time according to Fingal County Council commissioned reports, that constitutes approx. 2.5% of the current population in Ireland and approx. 8.5% of the Dublin area population according to BirdWatch Ireland. The current climate of rapid development is an increasing threat to the existing suite of terrestrial foraging sites in Dublin. These sites are ex situ to the designated sites and must be considered critical to the maintenance of the Brent geese population and therefore, these sites need to be protected by the legislation designed for this purpose.

The ex situ site that will result in habitat loss in order to accommodate compound 9 is even more important in light of recent grants of planning permission for other ex situ sites despite their designation. One site is the Santa Sabina playing fields which have planning permission for 81 houses with a new application for 96 being considered. Two other sites with planning are Erin's isle GAA Finglas and Scoil Earcain Finglas. The loss of these ex situ sites as part of the Natura Network, will increase pressures on the remaining terrestrial feeding sites in Dublin. The importance of the site is confirmed in the Wintering bird survey of the lands surrounding the Baldoyle Bay / Estuary December to February 2011 – 2012 which was commissioned as part of the South Portmarnock LAP. It states; *"This winter bird survey has demonstrated that the surrounding farmlands, amenity grasslands and golf club lands are important habitats for birds linked to the Baldoyle Estuary and should be viewed as being ecologically linked and not divorced from the estuarine areas. In times of hard weather, storms, high tides and low human disturbance times e.g. dawn/ night times birds frequently move from the estuarine areas onto the surrounding lands for additional feeding or roosting needs. This valuable mix of land use together with the estuarine wetland habitats produces this diversity, if the mix stays as it is this level of diversity should continue".*

The survey has found that the surrounding arable farmland in particular is an important feeding habitat for wader species from the estuary as well as winter finches, skylark and bunting. The arable croplands location so close to the estuary allows this rich biodiversity to develop. If the surrounding arable lands are re-zoned then the diversity and numbers of the bird species that give the SPA status to the Baldoyle Bay Estuary may be affected.

Once The Applicant Irish Water have compensated for the loss of habitat by reinstating compounds 9 and 10 as per ABP condition 16(c), there will still remain permanent way leaves and built infrastructure in the form of access manholes. No impact on sewage overflows at these manholes (as has occurred a number of times to the manholes on the Sutton to Ringsend pipeline) during commissioning and operation has been discussed. Another serious issue is the fact that The Applicant Irish Water failed to add the Portmarnock Wastewater Project which consists of 1.7km of rising man going through the same Maynetown lands and also through the same designated quiet zone for Brent geese. Irish water has been aware of this project well before the Greater Dublin Drainage Project application date, based on its planning application Reg. Ref:F19A/0400 which is still pending. The fact that they want to put a rising main pipeline and more manholes and way

leaves through the protected quiet zone was never given the chance to be assessed as The Applicant withheld this information, that only they could have known about. I wish to point out at this stage that I believe there is another important issue regarding compounds 9 & 10. The NIS and EIAR state that the impact of the two compounds is a temporary impact and that the compounds will be reinstated upon finalising of the outfall a year or two later. Fingal County Council also used the term reinstatement when looking for a written guarantee regarding the reinstatement of dune habitat at compound 10.

The level of development impact at the compounds together with the length of time they will be utilised and the use of the word reinstatement, means that the act of reinstating or restoring the sites, is more a compensatory measure and not a mitigatory measure under the hierarchy of mitigation. The legislation is clear. *If the competent authority considers the mitigation measures are sufficient to avoid the adverse effects on site integrity identified in the appropriate assessment, they will become an integral part of the specification of the final plan or project or may be listed as a condition for project approval. If, however, there is still a residual adverse effect on the integrity of the site, even after the introduction of mitigation measures, then the plan or project cannot be approved (unless the conditions set out in Article 6(4) are fulfilled).*

There are no mitigation measures for compound 9 and 10, in that the land that they will occupy will be lost for a substantial and avian habit-forming period of time and therefore will impact on the qualifying species and the integrity of the site. Particularly as the positioning of the compounds on a direct line on opposite sides of the SAC, will mean noise and light pollution from both sites, and heavy construction traffic twenty-four seven. This constant disturbance will most certainly contribute to fragmentation of the SAC from the area south of the marine based outfall tunnel line to the area north of the tunnel line. Habitat fragmentation is defined as the process during which a large expanse of habitat is transformed into a number of smaller patches of smaller total area isolated from each other by a matrix of habitats unlike the original (Fahrig, 2003).

The very strong case for the restoration of the compounds being a compensatory measure means that in order for this project to go ahead it would need to fulfil the conditions laid out in Article 6 (4) of the Habitats Directive. This project cannot fulfil these conditions as reference has been made in the application to the fact that the Wastewater Treatment Plant could have been built at any of the three preferred sites (and in light of the ASA flaws probably at some of the 6 that were screened out incorrectly) and so there are multiple possible alternatives to this site. The Inspector was wrong to assess no permanent impact at compound 9 and was wrong to accept restoration as mitigation when it is clearly compensation. Particularly in light of the fact that as the site was designated specifically for the protection and integrity of SCI species attached to the Baldoyle Bay SPA, therefore is considered as protected as the SPA under the Habitats and Birds Directive. Both The Applicant and Fingal County Council tried to suggest that the Murrough spit would act as a "replacement" feeding area for the lost designated quiet zone. In making this move The Applicant and Fingal County Council have put forward a COMPENSATORY measure. I pointed out in the oral hearing that the Murrough spit cannot be considered as compensation as it is already contained within Baldoyle Bay SPA and EU case law is very clear on this point.

On page 276 of her report the Inspector states: *I consider that there are no outstanding questions regarding the impact of the development on Brent geese and am satisfied that the development would not result in* ***significant short-term (or long-term) disturbance or displacement effects*** *taking into account surveys results and measures such as use of site hoarding. There is no significant population level displacement.* During the oral hearing the Inspector requested copy of the raw data surveys for the bird counts as they were not submitted for inspection as part of the application. I got to view these reports by copying them from the ABP Inspectors file as they were not on the Greater Dublin Drainage website with the other oral hearing documents. The raw data dates corresponds with the table in the EIAR. However upon viewing the raw data I could see that, on each date a surveyor only surveyed 2 sites and with 18 sites to survey it meant that between 2014-2017 the Maynetown land sites ((sites 4,5,12,13) were only visited 5 times. of the days in question, one day had substantial rainfall and another had gale force 7 winds. That is only 1-2 visits per year with only 6 hours per year surveying each site.

In addition to the severe deficit of survey time, the methodology was also questionable. RPS carried out the surveys and their ornithologist came from Northern Ireland – Belfast. He only works an eight-hour day so nearly all survey shifts were only 6 hours long with an hour's journey time to and from Belfast each day. Most surveys started at 8am with only one being a dawn survey and no dusk surveys on the lands. There was also no identification of whether the tide was at high or low phases with birds utilising lands in or around the Maynetown lands most during high tide. This was a glaring omission of relevant information. Absolutely no nocturnal surveys to identify roost sites were carried out. Most tellingly only 1 single visit took place between 2014-2017 in the Maynetown lands between 1st Dec and 1st of April the period when Brent Geese have migrated and make their habitat in Ireland. I put it to the Board that the Inspector should have found these surveys deficient it does not take an expert to find them lacking. Common sense would show that one visit in three years during winter to a protected quiet zone site designated for migratory wintering birds is severely deficient. We attach at Appendix a copy of an affidavit by expert birder Paul Lynch in relation to his perceived deficiencies in the surveys.

In an attempt to close the gap on this deficiency Portmarnock Community Association(PCA) together with Expert Birders John Lovett, Dave Dillion and member of the community took it upon ourselves to carry out a citizens science project on the use of the Quiet Zone by Light bellied brent Geese over the wintering period of 2020. I have attached the report at Appendix . It is clear that there is substantial use of this area for feeding all through the winter season during high tides and when eel grass in the estuary has been depleted.

As compensation will not be in place before the habitat is lost for the compound, access and corridor and wayleaves and manholes, which will negatively impact the integrity of the site under the current mitigation measure for this application. Legislative context: S.I. No. 477/2011 - European Communities (Birds and Natural Habitats) Regulations 2011. Part 4 section 27 (4) Public authorities, in the exercise of their functions, insofar as the requirements of the Birds Directive and the Habitats Directive are relevant to those functions, shall (a) take the appropriate steps to avoid, in candidate Special Protection Areas, pollution and deterioration of habitats and any disturbances affecting the birds insofar as these would be significant in relation to the objectives of Article 4 of the Birds Directive, (b) outside those areas, strive to avoid pollution or deterioration of habitats,

and steps to avoid, in European Sites, the deterioration of natural habitats and the habitats of species as well as disturbance of the species for which the areas have been designated in so far as such disturbance could be significant in relation to the objectives of the Habitats Directive.

A recent An Bord Pleanala decision- Board Direction BD-001078-18 ABP-302225-18 for a planning application by Crakav Ltd. reinforces my assertion that this development cannot be granted permission due to direct habitat loss that would result from construction of compound nine and to a lesser extend compound 10. The decision reads as follows: *"Having regard to the fact that the subject site is one of the most important exsitu feeding sites in Dublin for the Light-bellied Brent Goose, a bird species that is a qualifying interest for the North Bull Island SPA and having regard to the lack of adequate qualitative analysis and accordingly the lack of certainty that this species would successfully relocate to other potential inland feeding sites in the wider area, as proposed as mitigation for the development of the subject site in the submitted Natura impact statement, the Board cannot be satisfied, beyond reasonable scientific doubt, that the proposed development, either individually or in combination with other plans and projects, would not adversely affect the integrity of these European sites in view of the sites' conservation objectives."* Supporting Case Law: Briels / Case C 418/04 Commission v Ireland "The Birds Case"

As touched on the previous paragraphs there is an issue with how the Maynetown lands were rezoned in the Portmarnock south LAP and the reliance by the inspector on mitigations measure the we feel are not legally sound. Below we have laid out a history of the legal issues and the implications for this case.

1. History of zoning at Maynetown Portmarnock.

1.1 In the Portmarnock South LAP lands that were previously agricultural pre 2005 were zoned residential in Fingal Development Plan. As part of the Portmarnock South LAP, Bird Surveys were carried out to assess the use of the lands as ex situ feeding sites by qualifying interests (SCIs) of Baldoyle Bay SAC. The LAP referenced the following reports and surveys.

1.2 Fingal County Councils the Ecological Study of the Coastal Habitats in County Fingal Phase II – Birds (Figure 4 in the document, Fig 1 in this report), http://www.fingalbiodiversity.ie/resources/fingal_coast/2004%20Bird%20Habitats.pdf identified the use of the whole lands at Maynetown which was governed by Portmarnock South LAP by Brent Waders (see red squares).

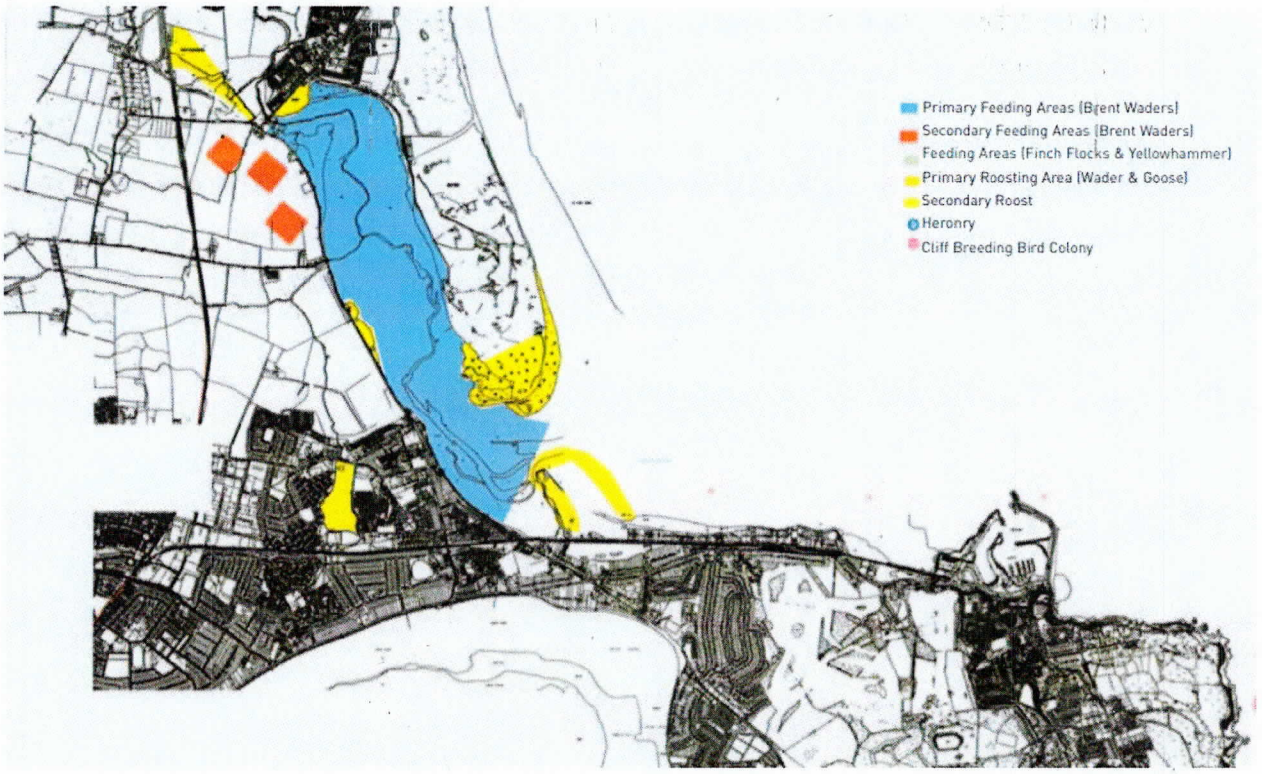


Fig 1. Use of Maynetown by Brent Geese.

1.3 Another report for Portmarnock South LAP NIS also commissioned by Fingal county council identifies the same area as a feeding site for a number of qualifying species for the SPA. The Portmarnock Lap quotes:

Informal consultation was also undertaken with Irish Brent Goose Research Group regarding lands to the south of the LAP area (Baldoyle-Stapolin) and the Portmarnock South LAP lands. It was noted that the LAP lands used by Brent geese is dependent on whether, and where, winter cereals have been planted, with the geese being attracted to winter cereals. It was noted that this was not the case during the 2012/2013 winter, in the past large numbers (1000+) have been observed, particularly in the field which slopes up from the coast road within the east of the LAP lands. (pers. comm., Resightings Co-ordinator, Irish Brent Goose Research Group, 2013).

1.4 The same report identifies main pressures and threats to light bellied Brent geese habitats as the following: Habitat loss/degradation (human induced) – agriculture, infrastructural development, human settlement, tourism, recreation, dams, invasive species; accidental mortality – collision; persecution; pollution – global warming, sea level rise, water pollution; natural disasters – drought, storms, flooding; changes in native species dynamics – competitors, pathogens/parasites; poor regeneration, restricted range; human disturbance – recreation, transport, agricultural, industrial.

1.5 The Portmarnock South Lap NIS https://www.fingal.ie/sites/default/files/2019-03/Portmarnock%20South%20LAP%20AA%20Natura%20Impact%20Report.pdf same report illustrates the use of

the lands by birds from a Pierce and Dillon 2011 survey (Fig 3 within document and Fig 2 in this report) and the report also states:

Bird species of Baldoyle Bay SPA, in particular LightBellied Brent Geese are known to use lands surrounding the SPA for feeding. A section of the agricultural lands adjoining the SPA, in the vicinity of C4 were noted to be of major importance with records of between 401-1450 Light bellied Brent Geese recorded from this area (Benson, 2009). Loss of feeding habitat may result in negative impacts upon qualifying interests of the SPA.

Figure 3: Study Area C with location of recorded wintering birds highlighted in green in relation to the LAP lands. (Pierce and Dillon, 2012)

FIG 2.

1.6 The importance of the site is confirmed in the Wintering bird survey of the lands surrounding the Baldoyle Estuary December to February 2011 – 2012 (report attached) which was commissioned as part of the South Portmarnock LAP. It states; "***This winter bird survey has demonstrated that the surrounding farmlands, amenity grasslands and golf club lands are important habitats for birds linked to the Baldoyle Estuary and should be viewed as being ecologically linked and not divorced from the estuarine areas.*** *In times of hard weather, storms, high tides and low human disturbance times e.g. dawn/ night times birds frequently move from the estuarine areas onto the surrounding lands for additional feeding or roosting needs. This valuable mix of land use together with the estuarine wetland habitats produces this diversity, if the mix stays as it is this level of diversity should continue. The survey has found that the surrounding arable farmland in particular is an important*

feeding habitat for wader species from the estuary as well as winter arable croplands location so close to the estuary allows this rich finches, skylarks and buntings. The biodiversity to develop. ***If the surrounding arable lands are re-zoned then the diversity and numbers of the bird species that give the SPA status to the Baldoyle Estuary may be affected."***

1.7 As is confirmed by Fingal County Council own reports , there was substantial use and reliance on the land by species protected by the designation of Baldoyle Bay SPA and that the experts deemed this ex situ feeding site as ecologically linked to Baldoyle SPA. The AA for Portmarnock South LAP identified that the plan would remove important feeding and roosting habitat, which was correct but then went on to incorrectly propose completely inadequate mitigation measures rather than what was required which was compensatory measures. The steps taken next, were then and continue to be in breach of the Habitats Directive and Birds Directive.

The Council suggested the following as mitigation (not compensation).

i). Designation of Bird Quiet Zone (see fig 3)
ii). Clearing of Murragh Spit (see fig. 5)
iii). The availability of existing sports pitches in the area for feeding.

1.8 These measure are insufficient and in breach of the Habitats Directive for the following reasons;

i) The Bird Quiet Zone was already within the area identified as a feeding area and already in use, for Brent Geese. You cannot mitigate or compensate with the same land that is being impacted by a project or plan.

ii) The Murragh spit was already within the Baldoyle Bay SPA and therefore cannot be considered as creating habitat to mitigate habitat loss. (see fig 4.)

iii). The existing sport pitches were already used by the Brent Waders for Feeding at that time see Fig 6. Benson 2005 so the availability of these pitches could not be consider as the brent wader population were already utilising these pitches in addition to Maynetown to nourish themselves at high tide and during low eelgrass production in the estuary. The removal of habitat loss at Maynetown therefore gave them less available feeding spots so the sports areas highlighted could never be considered mitigation.

Fig 3: Portmarnock South LAP Masterplan with Quiet Zone for Brent Geese and Lapwing

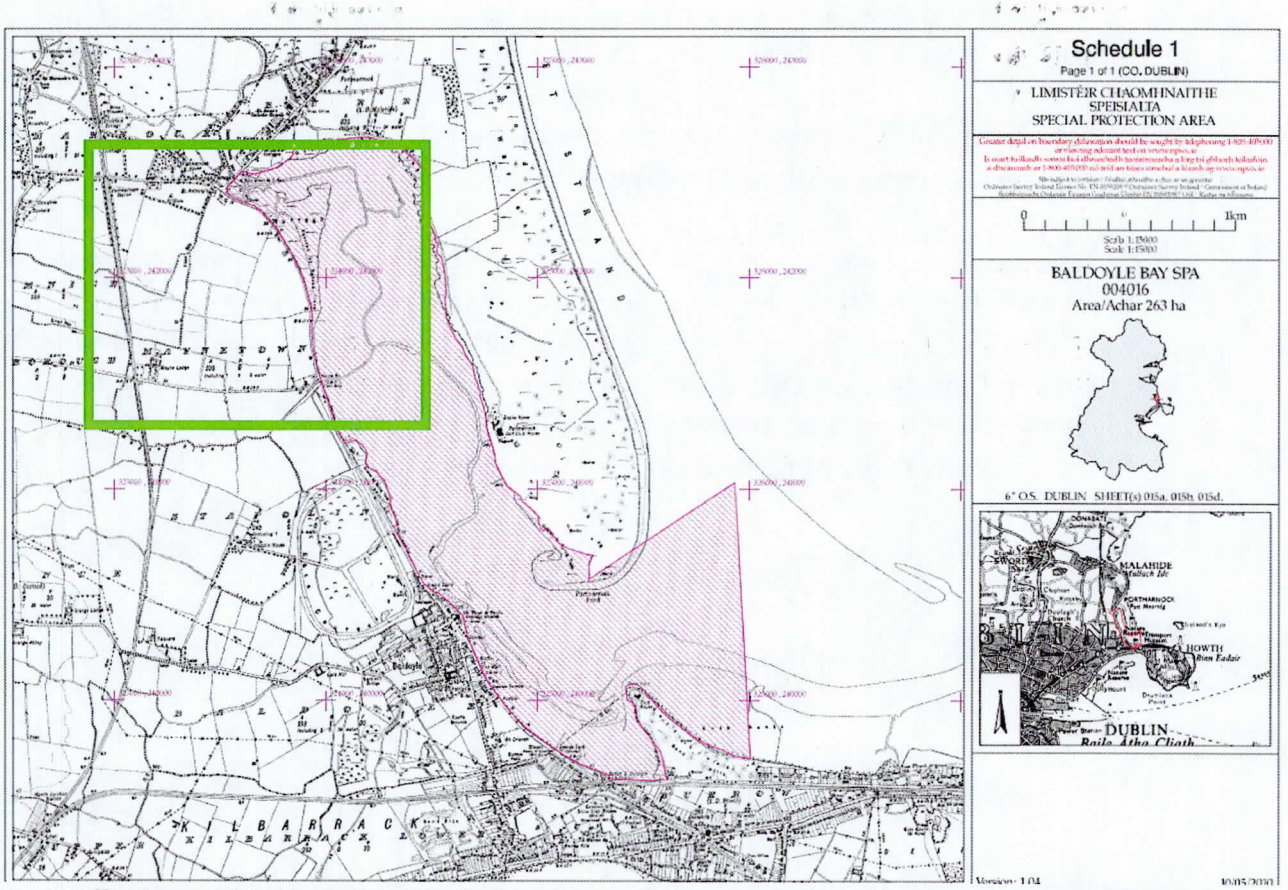


Fig 4. Offical map of Baldoyle Bay SPA designation, with Portmarnock South Lap area mapped in green.

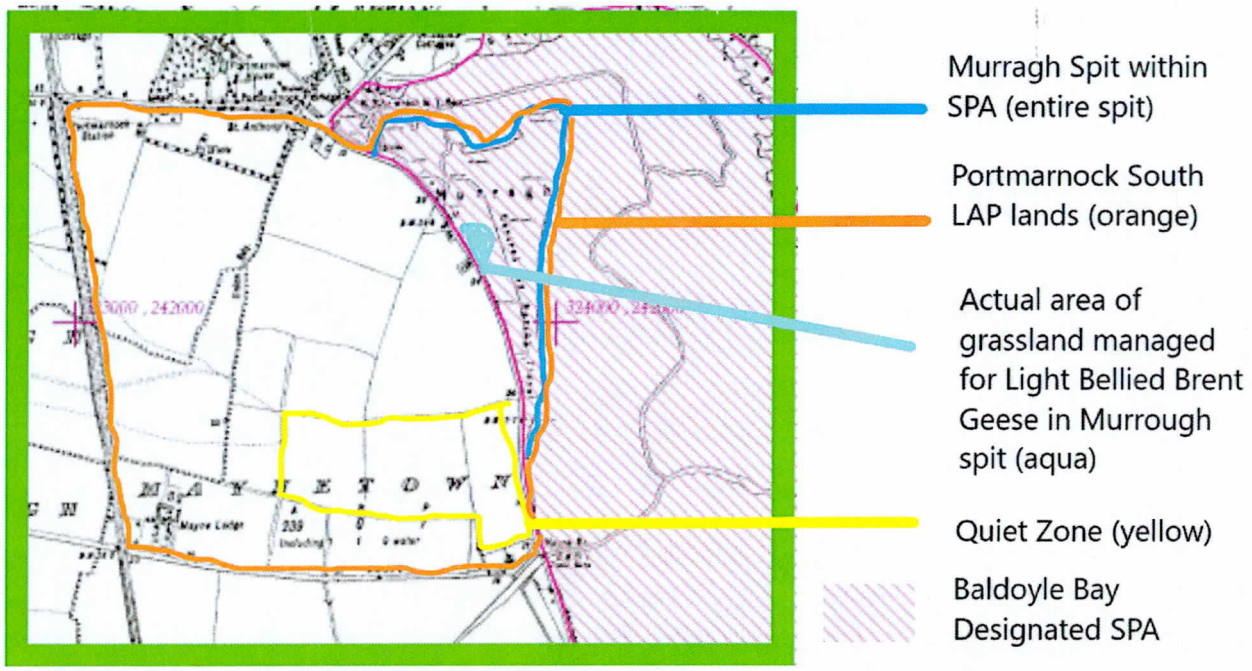


Fig 5. Detail showing inadequate mitigation measures, including the use of already designated lands with Murragh Spit.

1.8 If we were to apply what happened to the Birds habitat at Maynetown to a human scenario, it would be the equivalent of calling up to someone's house and saying we recognise that your right to use your house is protected by the constitution (Habitats Directive) and if we take away any part of it we shall supply equivalent accommodation space to compensate you for taking your house.

However after recognising that you use your whole house we are going to designate the Kitchen as your living space (the Quiet Zone) we know you already used it but now we have officially identified it as yours. We will then take the rest of your house for our own use, but you will be OK as you still have your garden (the Murragh Spit) that you already had use of and was designated for you. However we are going to regift the Garden again for our legal obligation of compensating you for commandeering the rest of your living space. You also have access to a network of restaurants that you regularly eat in that are shared by other uses and people (the existing Sports Pitches see fig 6 -L Benson illustration identifying lands already in use by LBBG for foraging), which we will take into account, in order to alleviate our legal responsibility not to reduce your eating areas. So to sum up we are taking your whole house for our purposes but you get to live in the kitchen, this is a fair and equitable arrangement.

1.9 But it is not a fair and equitable arrangement and the legislation governing this is unyielding in this regard. S.I. No. 477/2011 - European Communities (Birds and Natural Habitats) Regulations 2011. Part 4 section 27 (4) Public authorities, in the exercise of their functions, insofar as the requirements of the Birds Directive and the Habitats Directive are relevant to those functions, **shall** (a) take the appropriate steps to avoid, in candidate special protection areas, pollution and deterioration of habitats and any disturbances affecting the birds insofar as these would be significant in relation to the objectives of Article 4 of the Birds Directive, (b) ***outside those areas,***

strive to avoid pollution or deterioration of habitats, and steps to avoid, in European Sites, the deterioration of natural habitats and the habitats of species as well as disturbance of the species for which the areas have been designated in so far as such disturbance could be significant in relation to the objectives of the Habitats Directive.

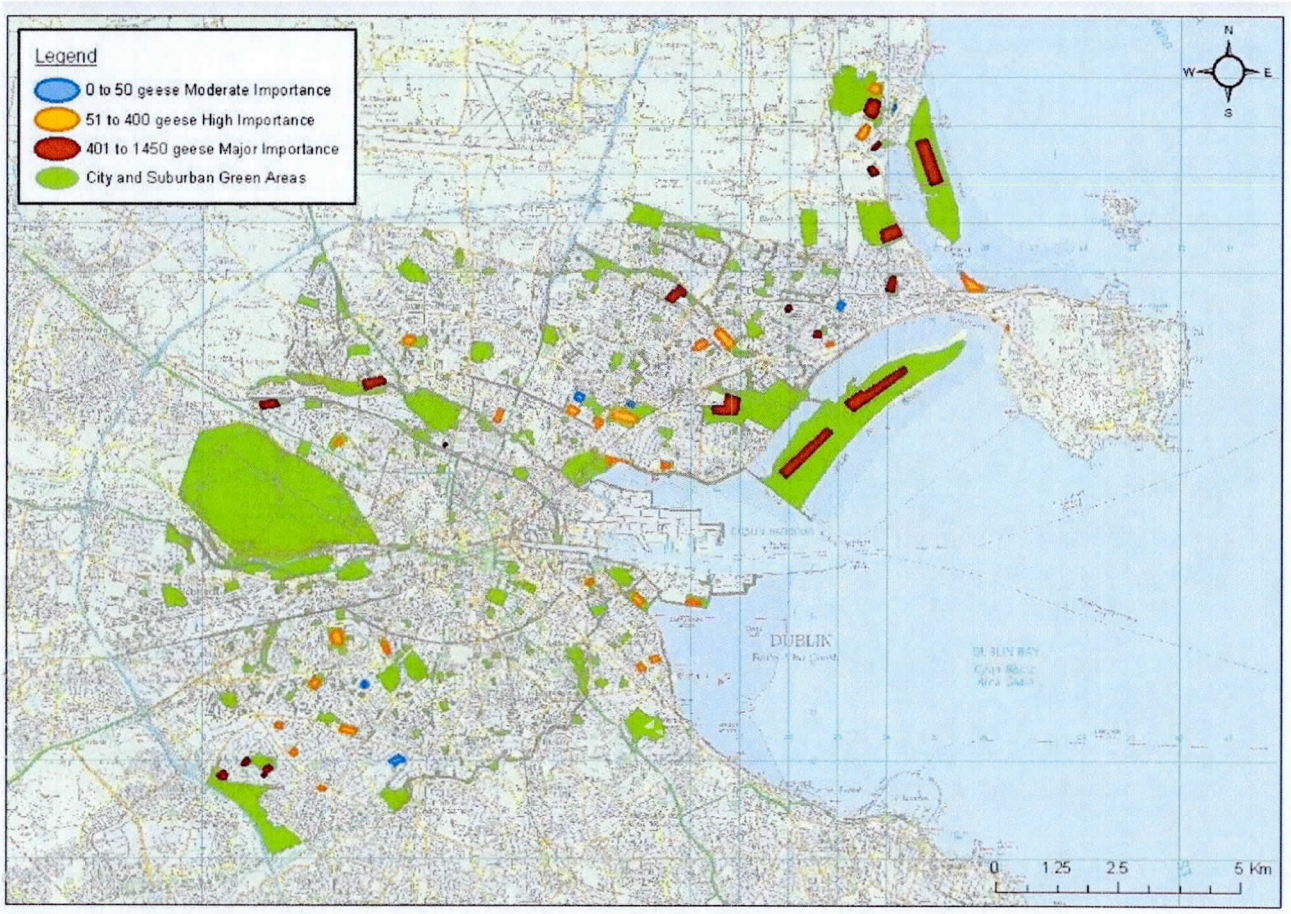


Fig. 6. L Benson 2009 identified feeding locations for Brent Geese.

1.10 An Bord Pleanála has already correctly applied this legal test in An Bord Pleanála decision- Board Direction BD- 001078-18 ABP-302225-18 for a planning application by Crekav Ltd.. This decision reinforces the proposition that this land rezoning should not have been granted permission due to direct habitat loss that would result from construction of SUDS wetland, The decision reads as follows: *"Having regard to the fact that the subject is one of the most important exsitu feeding sites in Dublin for the Light-bellied Brent Goose, a bird species that is a qualifying interest for the North Bull Island SPA and having regard to the lack of adequate qualitative analysis and accordingly the lack of certainty that this species would successfully relocate to other potential inland feeding sites in the wider area, as proposed as mitigation for the development of the subject site in the submitted Natura impact statement, the Board cannot be satisfied, beyond reasonable scientific doubt, that the proposed development, either individually or in combination with other plans and projects, would not adversely affect the integrity of these European sites in view of the sites' conservation objectives."*

1. 11 The legislation is clear. If the competent authority considers the mitigation measures are sufficient to avoid the adverse effects on site integrity identified in the appropriate assessment, they will become an integral part of the specification of the final plan or project or may be listed as a condition for project approval. If, however, there is still a residual adverse effect on the integrity of the site, even after the introduction of mitigation measures, then the plan or project cannot be approved (unless the conditions set out in Article 6(4) are fulfilled).

1.12 The test was not applied to the Maynetown lands in relation to appropriate compensation habitats when the Portmarnock South LAP was introduced and assessed. It is clear from the illustrations (fig 7) that the physical site size of feed habitat lost was not equally mitigated or compensated for by the created of equivalent sized feeding habitat on new lands not already used or designated for the protection of Special Conservation interests of Baldoyle SPA. As such the previous rezoning was illegal and must now be corrected with the AA and EIA for this Portmarnock South Phase 1D SHD, which must under law take into account the failure to actually compensate like for like for the loss of feeding and roosting habitat.

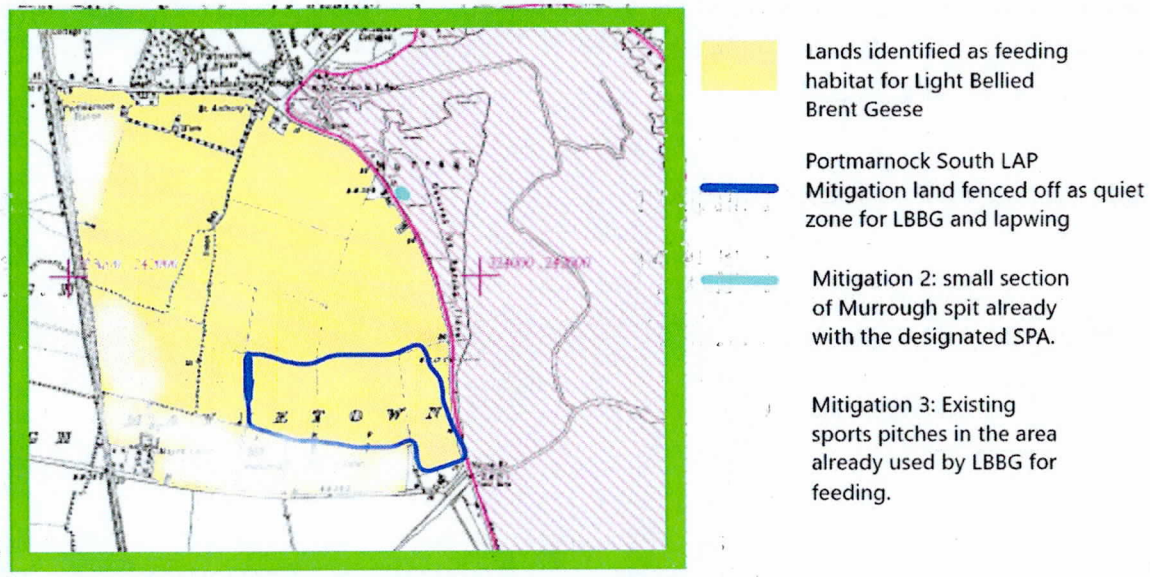


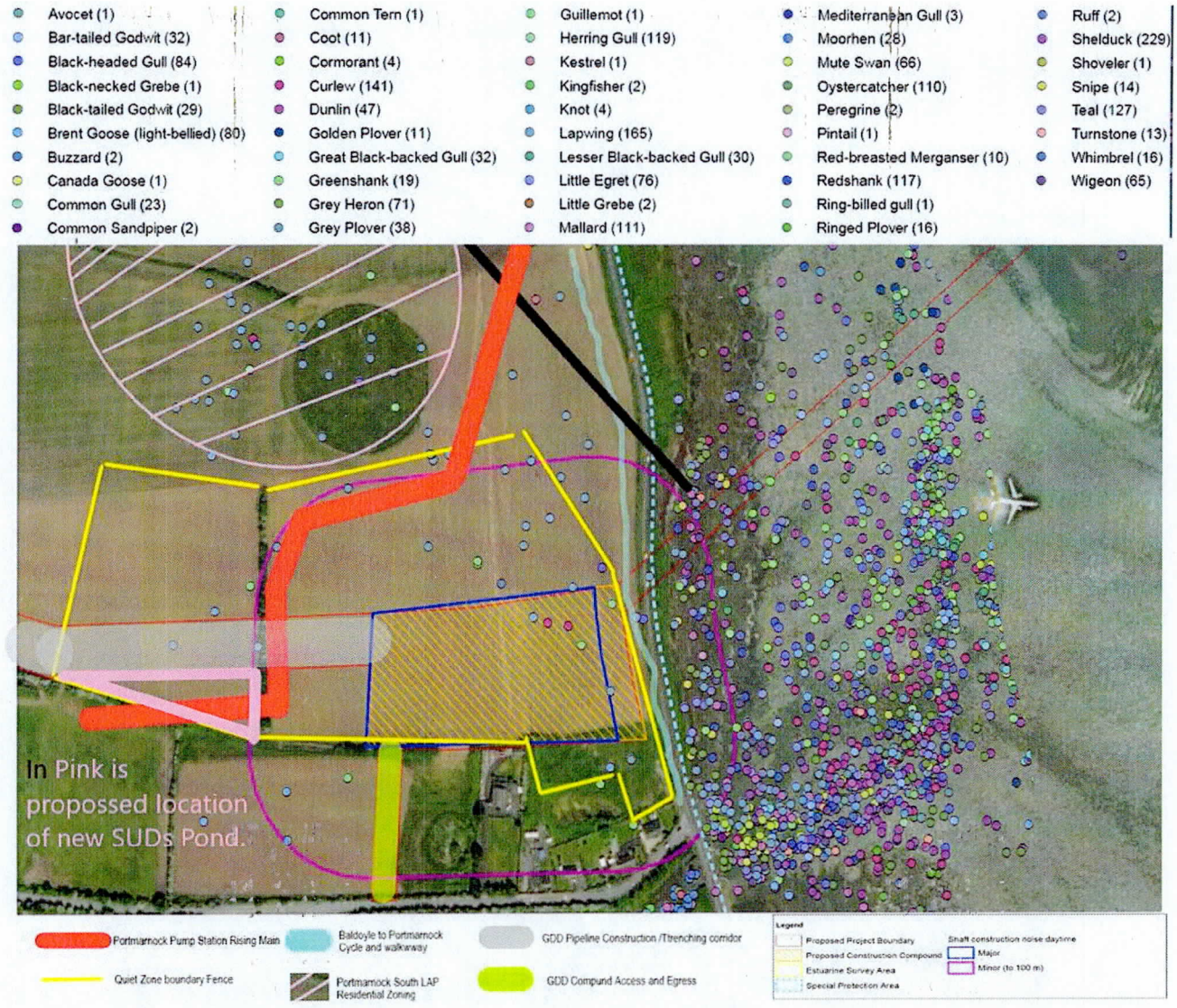
Fig. 7 – visual representation of original feeding habitat in comparison to mitigation habitat.

1.13 The Portmarnock South Area Lap NIS therefore incorrectly concluded: "*Once mitigation has been implemented in full, no decrease in favourable conservation status of Brent Geese are predicted and no significant impacts to Baldoyle SPA site integrity will arise as a result of loss of feeding habitat. This assessment has taken account of best available scientific information including a) current and historical Brent data for the fields in question, b) increasing national and local Brent Geese populations c) the species is not red-listed nationally, and d) taking account of mitigation measures including seasonal fencing and management measures of fields to the east and south of the LAP lands for wintering bird species including provision of a quiet zone.*"

1.14 Attached is a copy of a citizen science survey of the Quiet Zone lands which shows the recent and indeed the continued use of lands outside of the fences quiet zone area. It is very clear from this report that compensation and mitigation is still required in relation to the land take of feeding lands for the rezoning of Maynetown for the Portmarnock South LAP. This means that the development NIS is not complete as there are still historical impacts in the continued residential zoning of this area.

1.15 Cumulative impacts:

The quiet zone will be impacted by the Portmarnock phase 1D SHD, Greater Dublin Drainage Project, The Portmarnock reinforcement project – Portmarnock pumping station and rising main (see visual representation of cumulative projects in Fig. 8) . The land will not be fully remediated as there will be permanent wayleaves for maintenance access (disturbance) to the infrastructure that will be built within the site. This includes access chambers, manholes and vents that will be built within the actual quiet zone lands (see Fig. 9 – Access chambers mapped in quiet zones for GDD project) itself as part of these projects. These projects and the permanent infrastructure they contain, will remove grassland and introduce continuous disturbance from service vehicles and Irish water staff maintaining the access chambers and vents. This is in conjunction with one developer now tacking back the quiet zone land identified in pink in Fig. 8 for use as the developments attenuation for polluted SUDS runoff. Its the perfect example of death by a 1000 cuts when combine with Irish Water Projects.


Avocet (1)
Bar-tailed Godwit (32)
Black-headed Gull (84)
Black-necked Grebe (1)
Black-tailed Godwit (29)
Brent Goose (light-bellied) (80)
Buzzard (2)
Canada Goose (1)
Common Gull (23)
Common Sandpiper (2)
Common Tern (1)
Coot (11)
Cormorant (4)
Curlew (141)
Dunlin (47)
Golden Plover (11)
Great Black-backed Gull (32)
Greenshank (19)
Grey Heron (71)
Grey Plover (38)
Guillemot (1)
Herring Gull (119)
Kestrel (1)
Kingfisher (2)
Knot (4)
Lapwing (165)
Lesser Black-backed Gull (30)
Little Egret (76)
Little Grebe (2)
Mallard (111)
Mediterranean Gull (3)
Moorhen (28)
Mute Swan (66)
Oystercatcher (110)
Peregrine (2)
Pintail (1)
Red-breasted Merganser (10)
Redshank (117)
Ring-billed gull (1)
Ringed Plover (16)
Ruff (2)
Shelduck (229)
Shoveler (1)
Snipe (14)
Teal (127)
Turnstone (13)
Whimbrel (16)
Wigeon (65)
In Pink is propossed location of new SUDs Pond.
Portmarnock Pump Station Rising Main
Quiet Zone boundary Fence
Baldoyle to Portmarnock Cycle and walkway
Portmarnock South LAP Residential Zoning
GDD Pipeline Construction /Trenching corridor
GDD Compund Access and Egress
Legend
Proposed Project Boundary
Proposed Construction Compound
Estuarine Survey Area
Special Protection Area
Shaft construction noise daytime
Major
Minor (to 100 m)

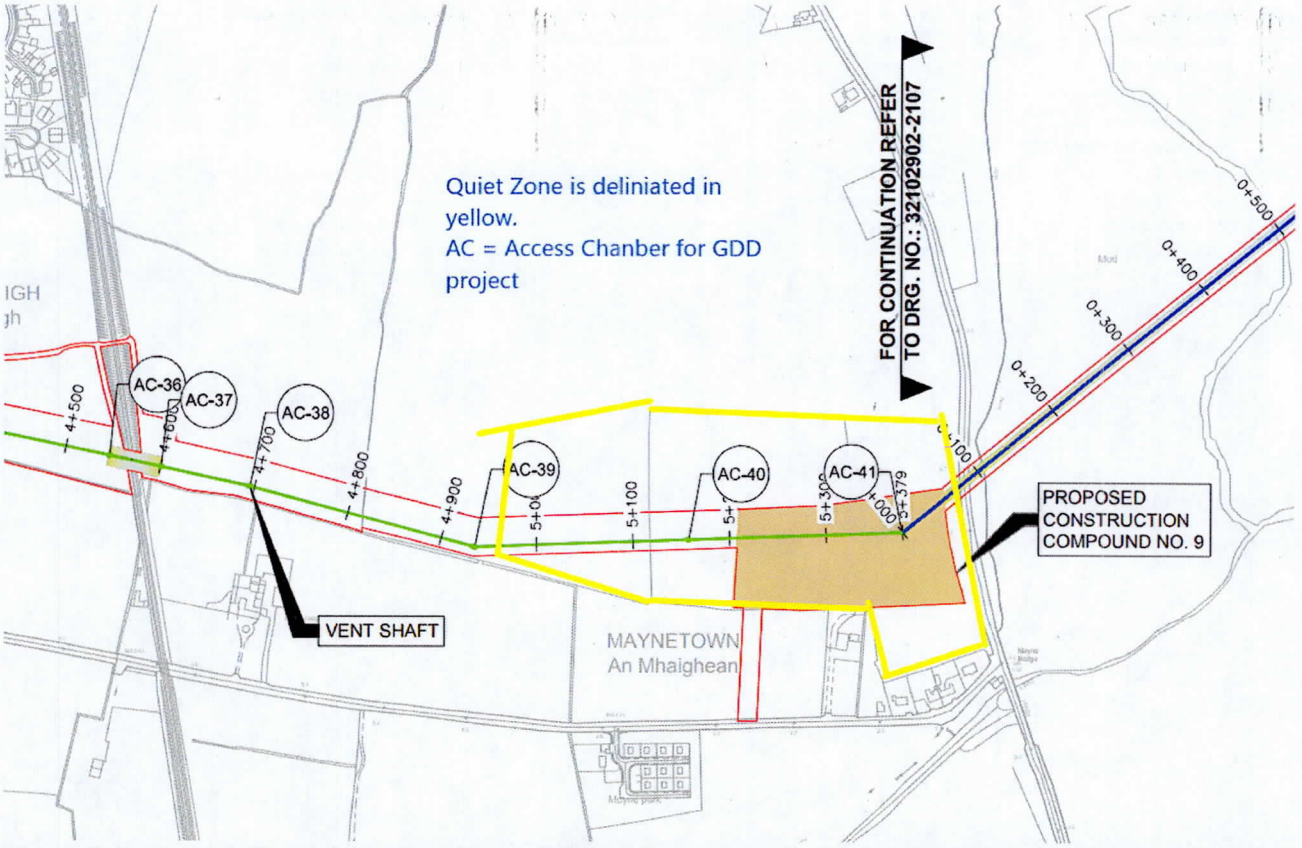


Figure 8. Representation of the cumulative projects that physically impact the Quiet Zone.Figure 9. Access Chambers(AC 40, AC41) for GDD Project within Quiet Zone protected area.

Figure 10. Satellite view of the

site with Quiet Zone and Murragh Spit Management area identified.

24. Public consultation Issues:

Aarhus Convention contravention: The introduction of UV treatment was significant additional information and a last-minute amendment to the application which the public was not informed about until the first day of the Oral Hearing on March 20th 2019. The following morning, I drafted a response which Ms. Bette Browne read out on my behalf stating that in light of the impact of the additional information that the hearing should be suspended and the public allowed to consult on the material change.

Irish water made a statement at the oral hearing the following day on behalf of Greater Dublin Drainage Project team which said the following:*7. Irish Water has provided a detailed statement on the proposed addition of UV technology to An Bord Pleanála and to all observers as part of the statutory consultation process and has made this information publicly available at www.gddapplication.ie. Therefore, the statutory consultation requirements under the legislative and planning regulations are met as the opportunity for the public concerned to consider and comment on the proposed enhancement is being provided while all options are open and before a decision on consent is taken by the competent authority.*

25. Aarhus convention – INTEL. In the application reference was made to a "Significant Industrial Customer" (SIC) in Kildare the customer however was never named. It became apparent during the oral hearing that there was some concern about the level of wastewater that came from this SIC but again no name was mentioned. After some research into the subject after the oral hearing closed it became apparent that the SIC was Intel in Leixlip. The difficulty with this information not being released to the public during the application process, was that INTEL discharges hazardous substances in its waste water and it is also a SEVESO site. The fact that their current wastewater, and the wastewater for the new FAB plant will be diverted to Greater Dublin Drainage project treatment plant in Clonshaugh creates a pathway receptor to Baldoyle SAC/ Rockabill SAC etc. in terms of the contents of their industrial effluent (heavy metals/ chemicals/ ammonia).

The application should have named INTEL so that their hazardous effluent components could have been addressed by the Public/ Statutory bodies and thus appropriately assessed by the Board in light of the serious impact it will have in terms of polluting the receiving waters. Intel's current waste water discharge licence is for 87'000PE. Irish water industrial load calculations, based on confidential representations made by a SIC in Kildare indicate that Intel's wish to increase their waste water load by a further 100000PE, to 187000PE, over a third of the capacity of the Greater Dublin Drainage Project wastewater treatment plant in Clonshaugh (500,000PE.). Intel effluent has a high level of nitrogen and in order to lower the limit in order to attain the required 100g/l, domestic wastewater from the Leixlip area is mixed with the Intel stream which is separate to the normal Leixlip agglomeration influent stream. According to Intel's 2018 Environmental report to the EPA, there are also high levels of ammonia, sulphates (over 6 million kgs a year), Nitrogen (over

208000 kgs a year), chloride (over 188000 kgs a year) and nitrates (over 19000 kgs a year) to name a few emitted in their waste water, which will prove detrimental to aquatic life. Baldoyle Bay is already classed as nutrient sensitive area. According to the Greater Dublin Drainage strategy – assessment of Wastewater Treatment Plants report - page 16. *"The average total nitrogen loading on the Intel stream combined with a cross flow from the main treatment stream are greater than the anticipated design loadings (i.e. average of 679 kg/day actual vs 644 kg/day design). In the sample of plant performance data evaluated, there are a number of instances where shock loadings have been encountered resulting in high BOD and N loadings to the Intel stream. The source of these shock loadings is not clear, and some further investigation is warranted."*

"The Intel plant has demonstrated a capability to deal with loadings in excess of the design loadings. The average total nitrogen removal capacity is 572 kg/day as compared to a design capacity of 419 kg/day. Notwithstanding this fact, there are occasions where the 9 mg final effluent standard has only just been achieved at figures below the average loading level" There are other issues that can be raised in terms of the future Intel wastewater loads and licensing in terms of it levels of chemicals in its industrial wastewater. No appropriate assessment has been done on this industrial wastewater and its possible impact on the shallow coastal waters off Ireland's Eye SAC and within Rockabill to Dalkey SAC. In the application the significant Industrial customer should have been named as Intel. In the oral hearing the Inspector made a pointed reference to Leixlip and its future loads which we now know after the fact to be reference Intel. The public should have had an opportunity to assess this industrial load. In addition, in light of the fact that Intel have their own wastewater discharge licence and their future FAB10 facility will also require an upgrade to that licence, there could also be an issue with project splitting as Intel will be part of the Greater Dublin Drainage Project wastewater treatment plant at Clonshaugh agglomeration. Also having looked at the NIS for Intel's new FAB development it appears that there was no was appropriate assessment on Baldoyle Bay SAC/ SPA, Ireland's Eye SAC/ SPA etc. carried out during the Intel planning application in light of the receptor pathway via the 9c to Clonshaugh and orbital sewer to outfall off Ireland's Eye.

We also note that INTEL utilise water recycling infrastructure at their other internation plants which save a massive amount of consumption of potable water and production of waste water. We ask why INTEL could not install the same Technology here as it is sue to take over a third on the capacity of the plant. The impact of the content on their effluent on the marine ecology at the outfall in terms of heavy metals, ammonia and nitrogen should be assessed.

26. Dublin Airport:

<u>Cumulative impact with Greater Dublin Drainage Project:</u>

We were extremely supervised to see that the EIAR has no actual assessment of the cumulative impact of the development with Dublin Airport (see Fig 1 for site location of GDD) , in particular the waste recovery facility (WRF) (referred to as a Sludge Hub Centre in GDD application) and biogas storage tanks that make up the part of the project see Fig 2. marked with an X for location of Biogas storage tanks. . The Biogas storage tanks in particular are on the current flight path for flights leaving the south Runway, the number of these

flights leaving in the direction of Clonshaugh appears to have increased since the opening of the North Runway based on our WEBTrack observations.

We have identified the development boundaries as they relate to the southern Runway flight path below.

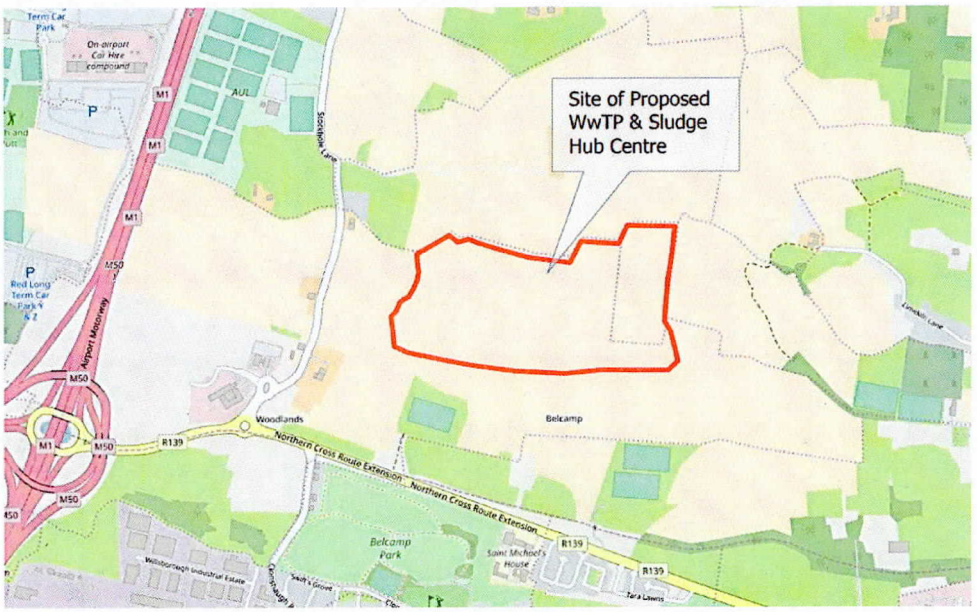


Fig 1. GDD site location map

Figure 2.2 Location & Indicative Layout of Proposed WwTP & Sludge Hub Centre Site Plan

Fig 2. GDD Clonshaugh WWTP indicative layout with red X beside biogas storage tanks.

Fig 3. Site Locations overlap between flight path and GDD application site. While this flight illustrated may not be on take off or approach the site is within the Outer Public saftey zone and flights do fly over the site.

Risk of Major accidents:

Our main concern is the potential risk of having the Biogas Storage tanks from the GDD under the flight path and also so close to such a major residential development (Belcamp lands) together with the sports playing fields to be used by children immediately adjacent to the Gas storage tanks. In addition to the potential impact from the tanks and an aircraft accident a combined impact of the Biogas Storage tank explosion which would cause major smoke and incendiary events, the tanks are within the outer safety zone for the airport flight path. An explosion could increase the risk of an aircraft emergency situation. Via Versa and emergency PAN PAN event with an aircraft or potential terrorist event could involve a plane catching into the Biogas storage tanks and cause a major accident impacting on the residents and sports clubs nearby.

We also wish to draw the inspectors attention to the Avonmouth disaster that occurred in a Wessex Water sewage treatment plant and explosion in the Biogas biosolids Silo caused debris and the body of 1 of 5 victims to be thrown 500 feet. There was a fire which the emergency services brought under control. The GDD application DID NOT carry out any assessment of an explosion in the Biogas Storage area. There is no assessment of the radius of impact that such as blast could have on surrounding land or aircraft on landing/ take off just above the plant. As such a major risk of accident assessment with competent experts must be carried out. Such an explosion could impede airport operations for a significant time and force all landings and takeoff through the North Runway. This may require HSA involvement as waste recovery facility and biogas storage facility may require seveso registration. The potential proximity of a SEVESO site should be flagged as part of the EIA into this application.

Below is an article on the accident and details of what contributed to it.

https://www.sciencefocus.com/news/avonmouth-explosion-what-are-biosolids-and-did-they-cause-it/

Avonmouth explosion: What are biosolids and did they cause it?

Published: 04th December, 2020 at 09:37 by Sarah Ridley in Science Focus

Police say the explosion at a water recycling centre in Avonmouth happened in a biosolid treatment silo, though the cause of the blast is unknown. Police have said the explosion at Wessex Water's Bristol water recycling centre in Avonmouth happened in a silo used to treat biosolids, though the exact cause of the blast is still to be determined.

What are biosolids?Biosolids are "treated sludge" – a by-product of the sewage treatment process. According to Wessex Water, the sludge is treated in anaerobic digesters – oxygen-free tanks – to produce agricultural fertiliser and renewable energy.

So how does the sewage treatment process work?

Wessex Water says during the sewage treatment process debris such as rags and large objects are removed first using screens.The sewage flows into tanks where the solids sink to the bottom and are removed as sludge. The sewage is then treated biologically by passing through filters with bacteria growing on them that feed off the waste and clean the water.

Why do we use biosolids?

According to Bristol-based waste management service GENeco, biosolids provide a "cost-effective alternative to bagged fertiliser" and help improve the fertility of agricultural land."Increasing the organic matter helps improve soil structure, giving plants better roots and helping them to yield more," said Neil Sims, biosolid recycling controller.

Sean Hill, director of waste management, adds that recycling sewage sludge helps supply essential nutrients back to the soil and provides "a successful blueprint for a sustainable future" for the planet.

Are biosolids dangerous?

Biosolids can produce flammable methane gas when treated with bacteria, though police could not comment as to whether this was the cause of the explosion and said the investigation was ongoing."The substance responsible for the explosion might well have been methane which, as is well known, is formed in sewage treatment," said Professor Clifford Jones, visiting professor at the University of Chester. "Sewage at an advanced state of treatment can form sewage sludge dust, which is capable of a dust explosion."

Will there be any fallout from the explosion in Avonmouth?

Luke Gazzard, from Avon Fire and Rescue Service, said there was not thought to be any further safety concerns to people living in the nearby area following the incident. There will be an investigation into the blast involving the Health and Safety Executive and a number of agencies.

Other new articles on Avonmouth Disaster.
https://www.bbc.com/news/uk-england-bristol-55183959

https://www.mirror.co.uk/news/uk-news/avonmouth-explosion-victim-thrown-150-23114784

Aircraft Accident/ Hijacking:

An aircraft accident or a terrorist hijacking must be considered at this site as it is near to the flight path and is further exposed to risk due to the Biogas Storage tanks that make up part of the Greater Dublin Drainage Project that shares the application lands. There have been a number of incidents involving aircraft component failures, and birdstrikes at Dublin airport. One such event happened in July 2019 when a bird strike damaged the engine of an Aer lingus flight taking off at Dublin Airport. The video showing takeoff with flash of fire and transcripts of the pilot an ATC are available here https://www.youtube.com/watch?v=uUg2aeKCvf0 . The plane had time to dump its fuel load at sea before coming into land, taking the flight path just immediately north of the application lands. (see full flight path Fig 4.) . any potential for such an event needs to be assessed as part of an EIA, AA and any planning application.

Terrorist high jacking: A resent Audit by the EU Aviation Authority found Dublin Airports security systems to be dangerously deficient with a number of dangerous prohibited items passing through security without detection. This adds to the potential for Dublin Airport to be seen as a target for a terrorist attack. The proximity of Major Infrastructure such as a Waste Water Treatment Plant with hazardous gas storage also increases the potential for Dublin to be a target on approach and take off. The fact that everyone is severely restricted in what they can bring onboard an aircraft illustrates that international authorities still see aircraft hijacking as a major threat to security. The potential impact such an attack could have on such a large residential area such as the one in this application must be assessed in great detail. We ask that ABP ensure that these assessments take place as part of EIA and AA. WE aks that a full Aerodrome Assesssment be carried out.

links to further info an Aer lingus incident and Dublin Security issues below:

https://www.irishtimes.com/news/ireland/irish-news/aer-lingus-flight-makes-emergency-landing-in-dublin-after-birdstrike-1.3962890

https://extra.ie/2022/05/22/news/guns-and-bombs-passed-undetected-through-dublin-airport-security

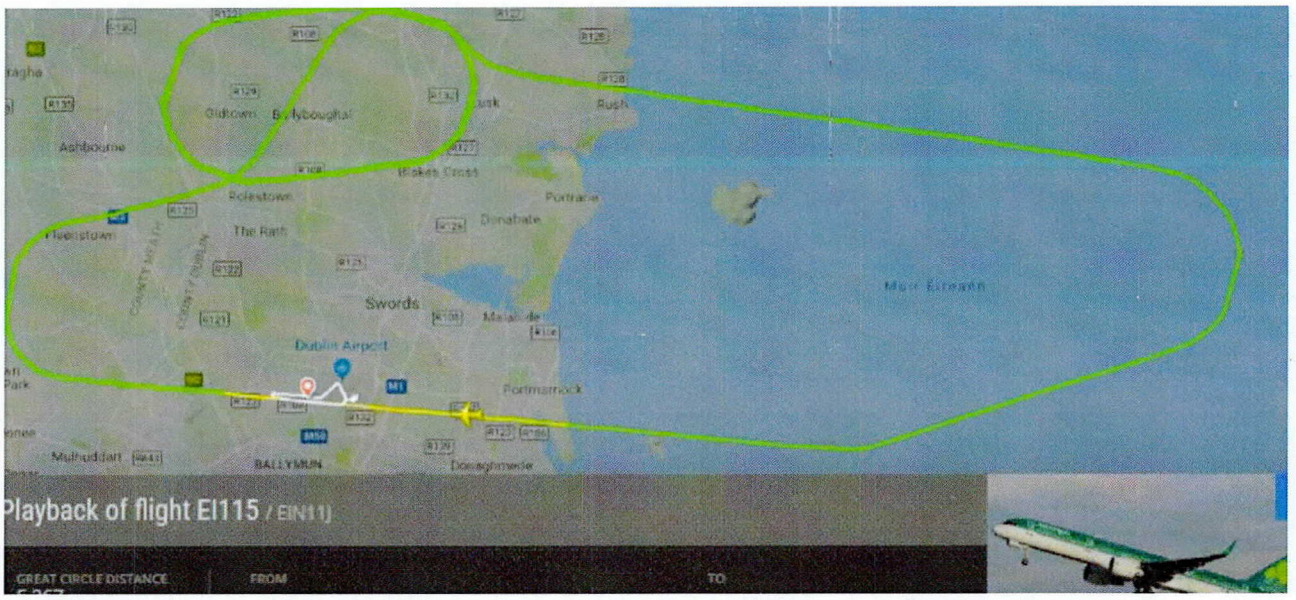


Fig 4 route Aer lingus flight with damaged engine took just over Gannon and GDD lands.

Cumulative impact of DAA Runway with GDD Project:

Below is some information of the impact of aircraft disturbance on birds. The second runway (North Runway) has now been granted and opened and the inspector indicated in her report that when it was opened that impact would have to be considered. A cumulative assessment on the North Runway and the change to night flight conditions must now be carried out and updates made to EIAR and NIS.

1 WHAT EFFECT DO AIRPLANES HAVE ON BIRDS? – A SUMMARY Norbert Kempf and Ommo Hüppop, Institute for Ornithological Research, Helgoland Ornithological Station

No one will expect this short question to produce an equally short and simple answer. The diversity of animal species and individual situations results in a wealth of barely classifiable and predictable responses. Outside in wild a lot of individual events can be observed that often appear contradictory. And opinions on the implications of a conflict between protection of birds and air traffic are correspondingly divergent. Representatives of authorities and associations nevertheless frequently expect a decision that is brief and unequivocal as possible. Attempts are often made to quantify and predict the effects of air traffic on birds in expert appraisals. The plethora of local individual situations and the different approaches to studies lead to results that are barely comparable with each other or generally capable of extrapolation. Against this background, the results widely scattered in publications and the "grey literature" (appraisals, dissertations etc.) have been compiled and their variability and identifiable universally applicable correlations have been presented. In this article, an earlier publication (Kempf & Hüppop 1998) has been partly updated and summarized on the basis of new developments and findings.

Why do birds react at all to flying objects? Almost all species of bird have to live with the threat of dangerous predators swooping on them out of the sky. The fastest possible escape flight as soon as a predator appears is the only sensible reaction in many cases. In the process, mistakes may also occur, so that birds respond to the sudden approach of animals that are essentially harmless by suddenly flying off. Airplanes can also prompt birds to take flight, even though the aircraft do not appear as predators. In experiments on birds with different dummies, it was found that escape flight reactions are the natural

response to all flying objects. Fear of dummies used many times quickly subsided, but not their attentiveness towards them. Individual features of the flying object, such as shape, size, angular speed etc., are of differing significance as trigger mechanisms. But since wild animals react to enemies according to a complex system, virtually no useful rules can be derived from this for air traffic. What kinds of reaction occur? When an airplane appears, all possible levels of excitation are described in birds, from outwardly non-visible physiological reactions to protection, ducking, increased calling activity, restless pacing back and forth, running away, flying off and returning to the same place or a place close by, flying off and leaving the area, right through to panic-like flight reactions. In addition, during the breeding period, various predatory species of bird repeatedly carry out pseudo-attacks and also genuine attacks on gliders, hang-gliders and paragliders.

Curlews sometimes launch vicious attacks on model aeroplanes that fly over their breeding 2 grounds, which can also lead to accidents. Waterfowl which take to the air because of an airplane usually stay in the air for one to three minutes, but sometimes also considerably longer. After this, it takes some time before the birds calm down again and resume their previous activity. Using modern electronic instruments, it is possible to measure the heart rate of brooding birds. Measurements show that these birds often react to the appearance of airplanes with a marked increase in heart rate, in other words they become nervous, even if no outward reaction is visible. It thus becomes clear that the loss of time immediately associated with taking flight is not the only effect of an airplane on birds which has to be taken into account. What are the effects of these reactions? A crucial question that needs to be answered is the extent to which effects can be anticipated on individual life expectancy, reproduction rate and ultimately on population size. ·

First of all, any reaction leads to changes in energy conversion. In species which fly a lot (e.g. swallows) the energy conversion during flight increases only to three times the base energy conversion, in poor flyers or at high speeds (e.g. in ducks) it sometimes increases to more than 20 times the base figure. In the case of escape and attack flights of e.g. waders of wet meadows, it has to be assumed that the energy consumption corresponds to twelve times the base energy conversion. Even when there is no outwardly visible excitation, the heart rate may show a fifteen-fold increase and energy consumption may at least treble even without physical activity. · In resting snow geese, it has been found that the time of food intake during the day may be reduced by up to 51 % if they are disturbed. Brent geese which are frightened every 30 minutes by aircraft or people must spend 30 % more time feeding compared with birds of the same species in less intensely disturbed areas. When the period of daylight and other resources are limited, it is not always possible to compensate for such loss of time. Disturbances can thus influence the time and energy budget of birds and hence, for example, the ability to lay down fat reserves for migration and breeding. In many species there is documentary evidence to indicate that breeding success depends on the available energy reserves at the start of the breeding periods. Birds try to make up for the energy deficits that come from constant disturbances by feeding at different times of the day, by feeding at the expense of other activities, e.g. preening, by increased feeding rates or by increased risk taking.

Even if it is hardly possible to provide any direct evidence in methodological terms, it becomes clear that individual life expectancy and reproductive capacity may be impaired. Disturbances can also lead directly to expulsion and thus loss of territory for certain species of bird. In geese, a rate of more than two disturbances an hour can lead to a decrease in the bird population in the area concerned. Breeding birds may for example be driven to the edge of their territory or out of their territory altogether by aircraft, which has obvious consequences for feeding and breeding success. In some cases, breeding areas are 3

abandoned altogether for this reason. Many bird species in Central Europe have been reduced to small scattered populations as the result of a deterioration and decrease in habitat. Thus even the slightest additional damage can lead to further decreases.

Which birds react to airplanes? · Most reports on disturbances by aircraft concern ducks and waders (plovers). Geese are particularly sensitive to airplanes. Aircraft disturbances are especially striking in those places where the birds gather in large swarms, in our case especially in the area of the Wadden Sea. · In the literature, negative effects of aircraft at breeding time are documented in particular for meadow-breeding waders (including curlews, godwits and lapwings) in relation to model aircraft. Flight reactions of breeding lapwings to powered airplanes have also been documented. In the case of breeding waders (Limicolae), however, air traffic with powered airplanes – in contrast to model aircraft – and low-flying ultralight aircraft (up to 1994, see UL article) – lead more rarely to visible reactions. The fact that the interests of meadow birds and air sports in particular often come into conflict is explained by their matching "habitat preferences": expansive, open and as far as possible unwooded areas that are remote from residential districts and are or can be extensively used. Apart from ducks and waders, disturbed reactions to flight activities have been reported for other waterfowl, great bustards, black grouse, various predatory birds and crows. Particular sensitivity to aircraft is shown by breeding colonies, especially those of larger bird species.

For colonies of terns, gannets, guillemots and pelicans, almost complete breeding failure has been documented following just a few aircraft fly-overs. The group of smaller song-birds has hardly been studied. Apart from in two reports on a military jet exercise and an air display, where some small birds reacted with panic-like flight movements, we did not find any reports in the literature about corresponding behavioural impairments. However, the reactions of small birds are difficult to observe. We know from our own observations that starlings at least frequently take flight in response to airplanes. In wine-growing regions, airplanes are used to drive away starlings. How do birds respond to different types of aircraft? Most studies on the effects of model aircraft are primarily concerned with meadow breeding waders during the breeding season. · In an area that has already been used by model aircraft enthusiasts for 17 years, lapwings reacted in two-thirds of fly-overs with protection-seeking behaviour (in 50 % of cases as a result of powered airplanes), and sometimes also with escape reactions. A strong reaction was found when several sources of disturbance occurred in combination. ·

A newly arrived female lapwing showed substantially greater anxiety than the well established birds. Even if the meadow birds in this study region appeared to have grown accustomed to the model aircraft to a certain extent, the flying of model aircraft still frequently led to disturbances, especially in combination with people and dogs running 4 around. · One author measured escape distances from model aircraft of 150 - 250 m for meadowbreeding waders in the breeding area, and 300 - 450 m for resting birds. On three occasions he observed that breeding lapwings were driven from their nests by model aircraft. The escape distances were in the range 130-200 m. As long as the aircraft flying continued, the birds did not return to their nests. · In studies on curlews in Southern Germany, losses of egg clutches were detected on several occasions as a result of flying model aircraft. The birds evacuated the areas completely or partly during model aircraft flying and often did not return for the whole day. Young curlews hatched more frequently in areas with no aircraft flying activity than in those where model aircraft were flown.

After a model aircraft site was set up, the curlew population in Isarmoos fell from a maximum of 15 to 3 - 4 pairs of birds. The short-eared owl, Montagu's harrier, snipe and corncrake all migrated away from the area.

Since the habitat was progressively worsening at the same time, however, it is not possible to identify the factor that was ultimately responsible for this migration. · In almost every large curlew breeding area in the southern region of the Upper Rhine there is at least one site used for flying model aircraft. The illustrates the potentially grave consequences of this type of aerial sports. · One author studied the propensity of model aircraft for perpetually frightening off birds. Remote-controlled model aircraft resulted in a marked frightening effect on almost all groups of birds. Geese reacted most strongly. It was observed that the main advantage of this frightening technique was that no acclimatization effects occurred. Other authors also assume that acclimatization to model aircraft is hardly possible. It is worth noting that hang-gliders and paragliders can induce greater anxiety in chamois goats and ibexes than other aircraft, including helicopters. In some cases, these animals respond with panic-like flight reactions and no longer appear in the same area again for the rest of the day. A corresponding effect in birds has only once been documented, and this was in black grouse. In the aerial sports regions of Oberallgäu, no decline was observed in any members of the grouse family. In the few direct encounters that were observed, black grouse did not flee. Larger predatory birds may feel disturbed in their area by hang-gliders and paragliders , and pilots even have to expect attacks. The abandonment of breeding grounds or breeding losses appear to be occurring from time to time by golden eagles as a result of disturbances by aerial sports enthusiasts, although it is difficult to provide any direct evidence of a link.

Reports on the marked negative effects of ultralight aircraft are essentially attributable to the low-flying practices (at a maximum height of 150 m) that were required by law until 1994. · There is evidence to show that, on the landing area of Reichelsheim, Hessen, a small brood of black-tailed godwits (over half the population in Hessen) and curlews died out in the 80s as a result of ultralight aircraft activities. On active flying weekends, the district hunting system of the birds broke up. The many years of air traffic with other aircraft apparently had no negative impact. · The numbers of resting and foraging Bewick's swans in an area of the Dutch delta region declined from 1400 - 4300 in the period from 1986 to 88 to a few individual 5 birds in 1989 after a take-off and landing strip for ultralight aircraft was installed nearby and had been in operation for a year. With the flying laws that have also been in place for ultralight aircraft since 1994 (e.g. minimum flying altitude of 600 m above the ground on cross country flights) and in view of the type of construction of modern ultralight aircraft, their effect on wild birds today can probably be regarded as similar to that of powered airplanes. With normal glide r operations, disturbing effects on birds are hardly to be expected: Except at take-off and landing, the thermal-dependent gliders mostly fly at a great height. In the literature there are few specific data on the reactions of birds to gliders/motor gliders. · The flight pattern of gliders with large wing-spans and a slowly gliding flight movement at what is usually a great height does however seem to fit the generalized pattern of an airborne enemy. In a study on breeding and resting birds in the Wadden Sea, the disturbing effect of motor gliders was considerably greater than that of powered airplanes. ·

The scarcity of gliders would also seem to play a role here: the only registered motor glider on the Wange raage during the period of the study triggered the strongest and longest-lasting reaction of all. As soon as the motor glider came into view, all the birds resting on the salt flats – even the usually unruffled gulls and oyster catchers – took to the air, making calling sounds as they circled the area for a long time. · In the case of black grouse in an aviary used to reintroduce birds into the wild, paniclike flight reactions were observed with the direct approach flight and fly-over of gliders and motor gliders – much more often than in the case of fly-overs by fighter jets. · Flight reactions of goats to gliders have been reported from the Alps. The effects of powered airplanes on birds have been reported in particular from the Wadden Sea. · On various

East Frisian islands, resting birds showed a reaction to direct aircraft flyovers in 50 – 90 % of cases. Resting birds reacted more by taking to the air (57 % of reactions) than breeding birds (22 %) (see "What other parameters influence the reaction?").

While there no marked differences were seen in the effects of aircraft flying at low and medium altitude, there was overall a discernible tendency for higher-flying aircraft to cause less of a disturbance than lower-flying aircraft. In a study on the impact of human disturbance on Brent geese, aircraft or helicopters were the cause of geese taking to the air in 26 % of all cases. While helicopters had the greatest impact, the reactions to airplanes were only slightly weaker. No clear difference was discernible between the impact of aircraft fly-overs at altitudes above or below 150 m. · In a study on the factors disturbing birds at a high-tide sanctuary in the Dutch Wadden Sea, airplanes and walkers were found to be by far the most importance causes of reactions. · According to a literature review on the disturbing effects on waders in the Dutch Wadden Sea, airplanes were among the most disruptive factors in the Wadden Sea.

The authors presented a model which can be used to calculate the area affected by a disruptive object. This model is based on data relating to escape flight distance, the distance within which birds interrupt their search for food, and the time it takes for the 6 various disturbing effects to disappear again. In the case of oyster catchers, the affected area for a mud-flats hiker walking at a speed of 3.6 km/h is 20 ha and for an airplane flying at an altitude of 150 m over the mud-flats 15,000 ha. This large area is produced with a 1000 m breadth of impact to the right and left, a speed of 150 km/h and a duration of 30 minutes. · A group of authors observed the flight of breeding meadow birds from powered airplanes in many cases – both at low altitudes (50 - 100 m) and also at very high altitudes (in some cases then very long protection-seeking behaviour). Powered airplanes induced protection-seeking behaviour in half of cases, and model aircraft in about two-thirds of cases. In terms of the intensity of the impact which they have on birds, powered airplanes lie between helicopters and jet fighters which are used comparatively little, if at all, in air sports. The disturbing effect of military jet fighters on birds is often less than one would expect in view of their rather unpleasant effects for humans.

By contrast, almost all authors come to the conclusion that, of all aircraft, helicopters most frequently lead to reactions in birds and at the same time to the strongest disturbance reactions. Systematic studies on the effect of free balloons on animals do not appear to have been carried out to date. In 1996, the Society of Wildlife Biology in Munich (Wildbiologische Gesellschaft München) carried out an extensive survey of experiences on this subject among balloonists, hunters, farmers, nature lovers, biologists and others. In many respects, the evaluation suggests a situation similar to that with other flying devices: most balloon rides are carried out without any discernibly negative consequences for animals. To some degree, many different species of bird and mammal show reactions of fear towards free balloons (flying at low altitude). Through a combina tion with the burner, which may ignite precisely when the animal is already in a state of nervous tension, panic flight reactions are possible with dramatic consequences for the individuals concerned. However, the effects of silent gas balloons is no less marked. The latest example of an unfortunate incident: a pair of sea eagles which had nested in the Segeberg district for the first time in 2000 suffered enormous disturbance from a landing hot-air balloon, whereupon they abandoned their brood. What other parameters influence the reaction? Since the visual faculties of birds tend to be essentially far better developed than their auditory faculties, they respond less to noise than is generally assumed. Silent flying objects can induce reactions similar in intensity to those induced by noisy aircraft. However, visually comparable loud airplanes on average induce more and stronger reactions in birds than quiet ones. ·

In breeding bald-headed eagles in North America, the parameter of noise (in contrast to distance or duration of visibility) played no role in disturbances caused by aircraft. · In a study on a colony of terns, it was not until jet noise reached 90 and 95 dB (A) that two and four percent, respectively, of the birds took to the air, and a further four percent showed a fright reaction. · With motorized model aeroplanes, it is above all the irregular changes of volume and frequency that play an important part in the disturbance effect. 7 There are more conclusive findings on the influence of flight altitude than there are on the influence of noise volume, but these findings are rarely based on measured altitude data. · In one expert appraisal on military air traffic, the altitude of helicopters was calculated from distance with reference to land markings and from the angle.

The frequency of bird reactions was clearly dependent on the altitude of the helicopters (at 50 – 80 m there was a reaction in 83 % of cases, at 120 - 150 m in 56 % and at 200 - 300 m in 27 %). But strong reactions were still induced even at greater altitudes. This is confirmed by various other authors. · Brent geese in Alaska reacted in 68 % of cases to airplanes flying at altitudes lower than 610 m and in 33 % to higher flying aircraft (altitude calculation via land markings, experimental fly-overs and listing into radio communications). · In two literature reviews for the Wadden Sea, it is concluded in the summary that effects on birds are very marked at altitudes below 500 m (1700 ft) and decrease substantially above this altitude. The disruptive effect of an airplane depends on the lateral distance of the fly-over. · In various studies, the frequency and intensity of the reaction decreased in inverse proportion to the lateral distance. From 700 to 1000 m upwards, no birds took to the air. · Geese, however, flew off up to a lateral distance of 1.5 km. The first unrest at the approach of an aircraft occurred on average at a distance of 2.6 km. In general, it can be said that an airplane travelling at high speed in a straight trajectory has less impact on birds than a slow airplane flying in a curved trajectory. A stronger reaction is often observed in combina tion with several sources of disturbance (stimulus summation). Such a situation frequently occurs precisely in those places where air sports attract spectators: flying model aircraft, flying sites for hang-gliders and paragliders and also in areas around airfields, day-tripping activities, people walking and dogs off the leash can cause additional disturbances.

The stress caused by people seeking relaxation produces stronger and longer-lasting reactions to airplanes in birds than are seen at times when there are no such leisure activities. Conversely, air traffic, even if it does not cause birds to take to the air, can lead to a substantial increase in the distance of the animals' escape flight from humans. Some stimulus-independent factors also affect the reaction of a bird. For example, breeding birds are inhibited from leaving the nest and for this reason alone react differently to disturbances. The willingness of parent birds to take risks may increase in the course of the day or with advancing incubation and rearing of chicks. Weather and season can also play a role. During the wing moulting period, when they are incapable of flight, ducks show substantially greater sensitivity in their reactions to airplanes than at other times. Birds in relatively large swarms tend more towards escape flight reactions than groups of a few individuals. In mixed groups, species may influence each other in their reactions. In the Wadden Sea, the birds are substantially more sensitive before high tide than after high tide. 8 Do birds become accustomed to air traffic?

Almost all authors report on habituation effects. It would seem that the frequency and above all the regularity with which an airplane flies past have a decisive influence on the reactions of birds. This is especially striking during military exercises or in the vicinity of airfields, where bird species that are

regarded as sensitive can also be found. · The same bird species which developed a certain tolerance to air traffic on Wadden Sea islands that have an airfield showed considerable flight reactions to comparable flyovers on Mellum, where there is no airfield in the vicinity. · Rare types of aircraft in a certain area also produce conspicuously strong reactions. These correlations provide an explanation for the different results, e.g. with regard to critical flight altitudes, in the various studies or for unusual observations that contradict the results of most other studies. But there are limits to the capacity for habituation. The uneven and unpredictable movements of model airplanes and to a certain degree also of gliders, hang gliders and low-flying trikes do not generally allow any habituation. In sensitive species (e.g. resting curlews or Brent geese) even regular air traffic does not lead to a greater degree of tolerance. At least some bird species or individuals react to heavy air traffic by leaving the area, and no habituation takes place. If only insensitive birds are then observed, there is a tendency for this to be confused with habituation. Demands of nature conservation · Many authors recommend maximum possible flight altitudes for airplanes to avoid disturbances of birds or mammals. The minimum altitude figures here range between 150 and 750 m. Most experts recommend a flight altitude of at least 500 m. · In various projects, there was also seen to be a need for an adequate lateral distance. Depending on the sensitivity of the animals studied, this minimum distance ranges from one to eight kilometres (for helicopters). · In several studies, authors demand that air traffic keep to routes and certain areas.

A separation into areas with regular traffic and areas free of air traffic on the one hand facilitate habituation and on the other effective protect the rest of the landscape. · In addition to this proposal not to fly over areas with especially sensitive and threatened species, seasonal or day-time restrictions of air traffic are recommended where there are specific or local problems. Examples of this are to set flight shows on a date in late summer or not to fly over ice-free places of refuge for waterfowl during periods of frost. The original article Kempf, N. & O. Hüppop (1998): "Wie wirken Flugzeuge auf Vögel? - Eine bewertende Übersicht" in Naturschutz und Landschaftsplanung 30, (l), pp.17 - 28, is based on a review of 161 publications and expert reports. These also list the citations of these studies, which are not given in this short summary. 9 Dr. Ommo Hüppop, 48, biologist, studied zoology, general botany, hydrobiology and fishing sciences and obtained his doctorate at the University of Hamburg. Since 1988 Director of the Island Station of the Institute or Ornithological Research, "Vogelwarte Helgoland". Main areas of work: ecology of seabirds and coastal birds, bird migration research, effects of human activities on birds {fishing, disturbances, offshore wind energy plants) Norbert Kempf, 45, biologist, worked mostly on the North Sea and Baltic Sea since 1983. Main areas of work: ornithological studies, effects of human activities on animals, aerial registration of animal populations, appraisal of nature conservation conflicts

full online version here. https://www.fai.org/sites/default/files/documents/ln_3-1_aircraft_effects_on_birds.pdf

26. Belcamp SHD- Cumaltive impact

Lands at Belcamp Hall (Protected Structure), Malahide Road (R107), the R107/R123 junction, Carr's Lane, and R139 Road, Belcamp, Dublin 17. (www.belcampshd.ie)

The Gannon Belcamp SHD is currently Live with ABP. There are potentially concerning interaction with Biogas storage of the GDD project (see Fig 1 for site location of GDD) , in particular the waste recovery facility (WRF) (referred to as a Sludge Hub Centre in GDD application) and biogas storage tanks that make up the part of the project see Fig 2. marked with an X for location of Biogas storage tanks. . The Biogas storage tanks in particular are on the side closest to the Belcamp SHD applications lands. The application for **Belcamp SHD** also appears to overlap with the application site for the GDD which we have attempted to illustrate by lining up each site location map on one picture (fig 3). as per Gannons application they also own the land on the western edge of the GDD site.

The information on GDD which is a live An Bord Pleanála case (Board's Decision 301908 quashed by Order of the High Court (Perfected on the 16th July, 2021 New Case Number ABP-312131-21.) can be found at GDDapplication.ie with the planning report for GDD at https://www.gddapplication.ie/planning-sites/greater-dublin-drainage/docs/planning-documents/planning-reports/SID-Planning-Report.pdf

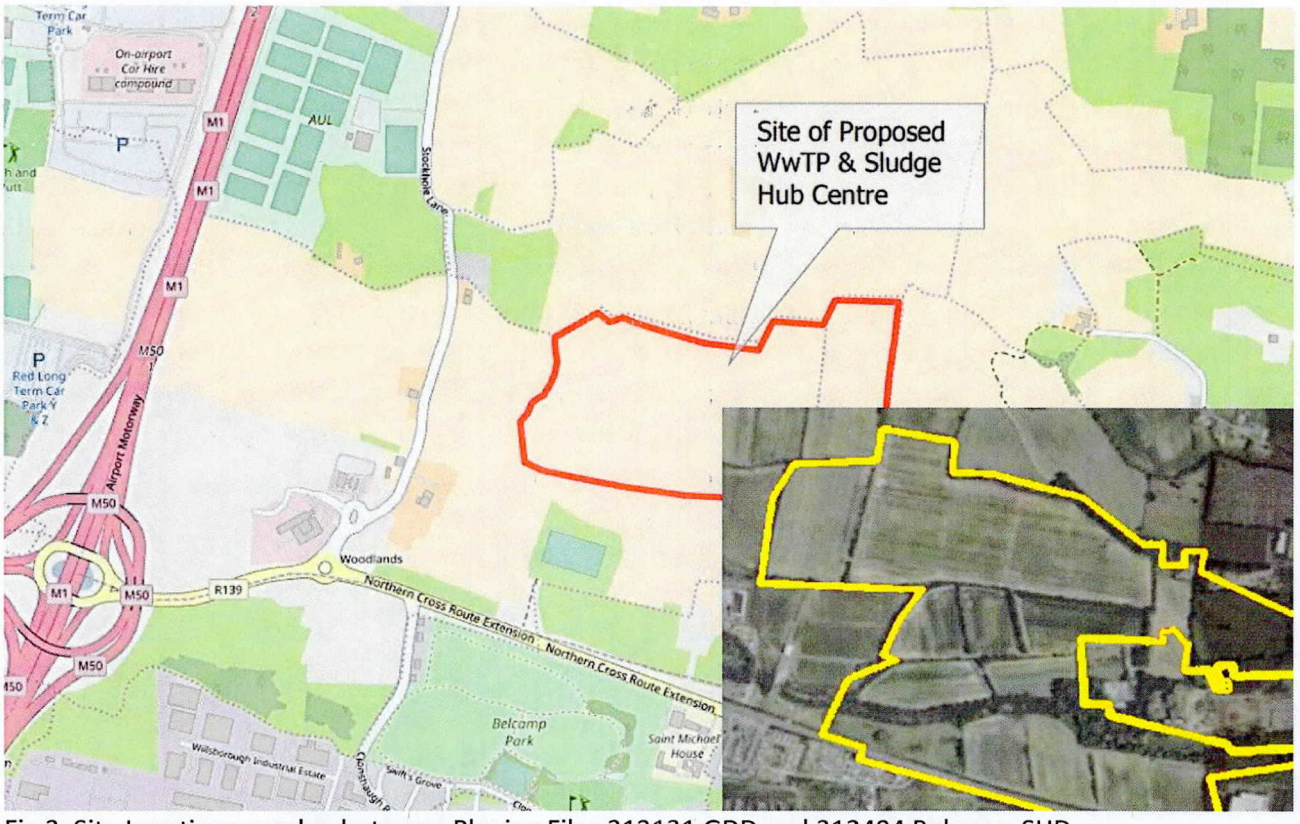


Fig 3. Site Locations overlap between Planing Files 312131 GDD and 313494 Belcamp SHD.

Risk of Major accidents:

Our aim concern is the potential risk of having the Biogas Storage tanks from the GDD so close to such a major residential development together with the sports playing fields to be used by children immediately adjacent to the Gas storage tanks. In addition to the potential impact from the tanks a combined impact of the Biogas Storage tank explosion which would cause major smoke and incendiary events, the tanks are within the outer safety zone for the airport flight path. An explosion could increase the risk of an aircraft emergency situation. Via Versa and emergency PAN PAN event with an aircraft or potential terrorist event could involve a plane catching into the Biogas storage tanks and cause a major accident impacting on the residents and sports clubs included in this application.

we wish to draw the inspectors attention to the Avonmouth disaster that occurred in a Wessex Water sewage treatment plant and explosion in the Biosolids biogas Silo caused debris and the body of 1 of 5 victims to be thrown 500 feet. There was a fire which the emergency services brought under control. The GDD application DID NOT carry out any assessment of an explosion in the Biogas Storage area. There is no assessment of the radius of impact that such as blast could have on surrounding land or aircraft on landing/ take off just above the plant. The application gives no indication of the holding capacity of the tanks and therefore the blast radius. As such a major risk of accident assessment with competent experts must be carried out. This may require HSA involvement as waste recovery facility and biogas storage facility may require SEVESO registration. The potential proximity of a SEVESO site should be flagged as part of the EIA into this application.

27. Sludge Hub Centre:

The Regional SHC is of not small scale and therefore cannot be considered as ancillary to the WWTP and as such can be assimilated into the larger project as being also a utility development in order to sidestep material contravention of zoning. We believe it is not ancillary for the following reasons.

-The WWTP treats 500,000 PE of sewage the Regional SHB treats 750,000 PE of sewage
-The WWTP requires the Regional SHC centre to treat its by-product of sewage sludge
-The WWTP Plant requires the Regional SHC to provide Biogas for energy to run the plant
-The SHC could use Biogas to run itself
-The SHC treats by-product not related to the WWTP
-The Regional Sludge Hub Centre is required under national plans whether or not the WWTP is built.
-The Regional SHC could perform as a stand alone development without the WWTP
-The WWTP could not perform as a Stand Alone development without the Regional SHC

another way of lookinf at this issue is due to the fact that the Regional SHC processes/ services a larger volume of Sewage than the WWTP and the fact that the SHC could function as a stand alone development whereas the WWTP cannot function without the SHC as a stand alone development, it is the SHC that is the larger treatment facility by scale of use/ treatment process and therefore it is the WWTP that is subservient to the Regional Sludge Hub Centre. If you were to apply the argument that the smaller scale , dependant/ subservient development should be assimilated into the larger scale development then by the respondents/ notice party's averments the WWTP should be considered part of a Waste Recovery Development rather than the other way round.

This would mean the whole development contravenes the development plan by being sited in a greenbelt zone. And the whole development would require SEVESO registration.

We also bring to the Bords attention that as the WWTP treats the concentrated dewatered Sludge run-off of from the SHC which has been decalred as being up to 250,000 PE, the project could be considered as actually treating effluent up to 750,000 pE (500,00PE running through main plant and up to 250,000 PE from SHC dewatered sludge) as such all Environmental impact assessments should be for a 750,000 PE equivalent WWTP.

The Sludge Hub Centre is a REGIONAL Sludge Hub centre and is Co-located at the site. It is located in the same curtilage but is not incidental to the plant. In planning law an ancillary development (say within the curtilage of a residential dwelling) still requires planning permission and assessment on the merits on its use in its own rights and if it has a use other than as an "ancillary use to the dwelling" then it must be assessed in the context of that use (home office / is it rateable or allowed in a zoning context.) same argument as Regional SHC must be assessed on the basis of the Waste recovery facility as it serves that function outside of the GDD WWTP. In a simplified argument a couple who co-habituate are still required by revenue to complete individual tax assessments.

28. Other issues to be addressed:

- New Critical Infrastructure Bill
- Ability of Irish Water to CPO Land – See appendix on this matter.

-No Internal Drawings of Buildings
- No assessment of Piling at outfall or cable crossing (risk assessment to damage of cable).
- Community Gain – Educational facility is a Material Contravention of the Fingal Development plan in relation to Public Safety Zone – not valid
-Circular economy legislation – reuse of Water in wastewater now compulsory.
-why no solar, rainwater harvesting etc included in development.
-Lack of Electricity capacity with WWTP being one of the highest electricity users.
-No assessment of freshwater impacts/ temperature impact of discharge on marine ecology. Eg Saline loving species etc.
-Why no tertiary treatment Nitrogen removal/ phosphorous recovery/ not BAT
- Need to be aware that as the development will not happen until 2024 the new Fingal Development Plan will be in place and the development should adhere to the provisions of the plan. If the plan constrains the development to the point of making it unviable at the site then It may be that this application is premature.
- Avian Flu issue and they crossing over ogf the virus to marine mammals
-New ICUN reports must be considered as populations further under threat and new species red listed.
-An insect survey of compound 10 is required due to rare beetles previously recorded.
-National Monuments have recorded a new monument directly in the path of the Pipeline trenching corridor at Maynetown by compound 9. New updated assessment is required.
-No management plans for Ireland's EYE SAC/ SPA, Baldoyle BAY SAC/ SPA, Rockabill to Dalkey SAC and others with 15km of outfall route may preclude the board from being able to assess impacts under the habitats Directive.
-There was a number of unassigned water bodies under the Water Framework Directive when the last decision was made . The EPA have carried our a form of Grouping analysis to apply status in the intervening time but we believe that this method is not legally sound particularly for Natura 2000 sites. In any cases further assessment under water framework should be carried our and allowed public consultation as additional information.
-Drinking water directive – contamination of rivers that are used for drinking water by wastewater discharges – does it apply in the GDD / 9C/ Leixlip network?
-CENSUS data – update all reports to 2022 CENSUS data currently using 2016
-Section 4 discharges in Tolka and rivers connected to Ballymun PS must be modelled in addition to WWDL overflows.
-No overflows identified on drawing for Orbital Sewer Why not
- Law regarding insore fishing by large vessels has been overturned – cumulative impact and foreshore licenceing issues.
-cognisance of Council regulation 575/2010 on persistent organic pollutants
-Will leachate be received at the GDD WWTP?
-Portmarnock South Bathing waters is currently undergoing redesignation as bathing water via Fingal County Council and will require excellent water status. This change must be addressed in updated EIAR.
-Why no AGS treatment – alternatives?
-BAT mining of sewage sludge for metals – Circular economy
-Process failure only addresses electrical failure, not any other equipment failures no actual process failure modelling for discharges to rivers upstream of GDD PLANT..
-no SWOs are monitored In Fingal and parts of DCC lack of overflow data may inhibit ability to modell discharges so worst case senario of Full Flow overflows must be applied.

Construction Methodology for Arklow WWTP application contradicts evidence in GDDP in relation to safe depth for trenching. In Arklow IW Expert says its not safe below 5 metres in GDDP it appears to be ok. Can Irish Water Clarify. (see Appendix)

Greater Dublin Drainage Project

SID Application

ABP Case file 312131

Appendix Reference:

1.6

Appendix Description:

Sabrina Joyce-Kemper submission 7th June 2024

ADVICE NOTE

ON THE LIFESPAN OF ECOLOGICAL REPORTS & SURVEYS

APRIL 2019

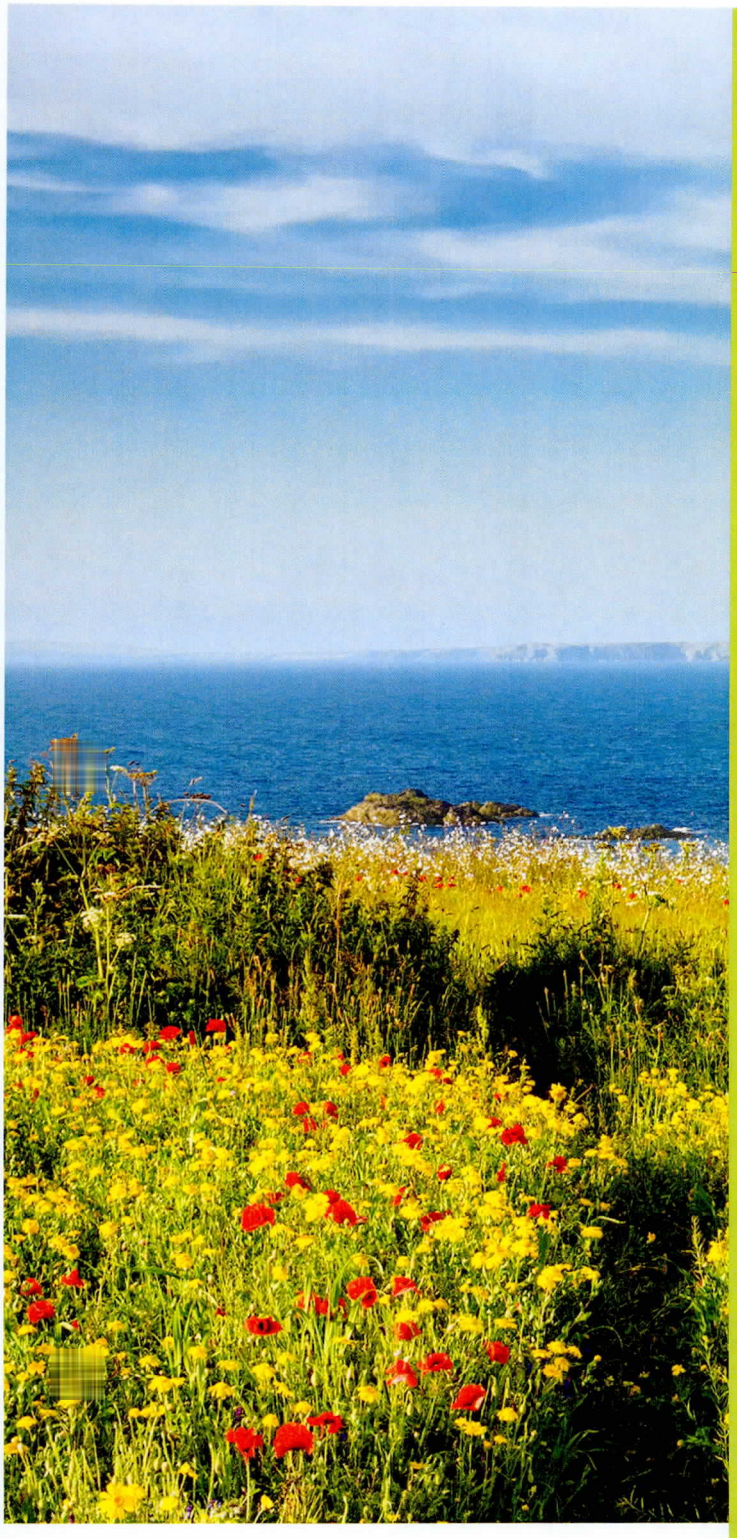
CIEEM

It is important that planning decisions are based on up-to-date ecological reports and survey data. However, it is difficult to set a specific timeframe over which reports or survey data should be considered valid, as this will vary in different circumstances. In some cases there will be specific guidance on this (such as for the age of data which may be used to support an EPS licence application). In circumstances where such advice does not already exist, CIEEM provides the general advice set out below.

For some projects the time taken between commencing the scoping or design and submitting a planning application can be several years, and this can result in the early ecology surveys becoming out-of-date (based on the advice set out below); this can lead to additional costs for developers associated with updating survey data. Nevertheless, there are considerable advantages associated with undertaking surveys early during the scoping or design phases of a project.

Ecological consultants should give careful consideration to which, if any, surveys need to be updated; design their data collection in a way which maximises the benefits of early surveys whilst minimising the costs to developers; and provide clarity on the likely lifespan of surveys in their reports.

AGE OF DATA	REPORT / SURVEY VALIDITY
Less than 12 months	Likely to be valid in most cases.
12-18 months	Likely to be valid in most cases with the following exceptions: • Where a site may offer existing or new features which could be utilised by a mobile species within a short timeframe (see scenario 1 example); • Where a mobile species is present on site or in the wider area, and can create new features of relevance to the assessment (see scenario 2 example); • Where country-specific or species-specific guidance dictates otherwise. Report authors should highlight where they consider it likely to be necessary to update surveys within a timeframe of less than 18 months.
18 months to 3 years	A professional ecologist will need to undertake a site visit and may also need to update desk study information (effectively updating the Preliminary Ecological Appraisal) and then review the validity of the report, based on the factors listed below. Some or all of the other ecological surveys may need to be updated. The professional ecologist will need to issue a clear statement, with appropriate justification, on: • The validity of the report; • Which, if any, of the surveys need to be updated; and • The appropriate scope, timing and methods for the update survey(s). The likelihood of surveys needing to be updated increases with time, and is greater for mobile species or in circumstances where the habitat or its management has changed significantly since the surveys were undertaken. Factors to be considered include (but are not limited to): • Whether the site supports, or may support, a mobile species which could have moved on to site, or changed its distribution within a site (see scenario 1&2 examples); • Whether there have been significant changes to the habitats present (and/or the ecological conditions/functions/ecosystem functioning upon which they are dependent) since the surveys were undertaken, including through changes to site management (see scenario 3 example); • Whether the local distribution of a species in the wider area around a site has changed (or knowledge of it increased), increasing the likelihood of its presence (see scenario 4 example).
More than 3 years	The report is unlikely to still be valid and most, if not all, of the surveys are likely to need to be updated (subject to an assessment by a professional ecologist, as described above).



EXAMPLE SCENARIOS

1

- Trees or buildings on site have been surveyed for evidence of bat roosts and none were found; new roosts may be present, and trees or buildings may have developed new features which were not previously present. An update bat roost survey is likely to be required.
- One or more potential otter resting sites have been identified, although there was no evidence of use at the time of the survey; such features may have been used by otters during the intervening period. An update otter survey is likely to be required.

2

- A badger survey confirmed the presence of badgers on site; new setts may have been excavated within the site. An update badger survey is likely to be required.

3

- An area of grassland was heavily grazed by cattle at the time of the original survey and was considered to be unsuitable for reptiles, although slow-worms were known to be present in the wider area; grazing has since ceased and the grassland has been cut once annually, which has encouraged the development of a tussocky sward which provides suitable habitat for slow-worms. A reptile survey is now likely to be required.

4

- A water vole survey confirmed their absence from the site but identified them as present in the wider area surrounding it; a recovery project is underway in the local area through a mink control programme, which is encouraging the spread of water voles.

CIEEM
Chartered Institute of Ecology and Environmental Management

43 Southgate Street
Winchester, Hampshire SO23 9EH

t: 01962 868626
e: enquiries@cieem.net
www.cieem.net

Greater Dublin Drainage Project

SID Application

ABP Case file 312131

Appendix Reference:

21

Appendix Description:

Sabrina Joyce-Kemper submission 7th June 2024

IP/00/96

Brussels, 2 February 2000

Commission adopts Communication on Precautionary Principle

The European Commission has today adopted a Communication on the use of the precautionary principle. The objective of the Communication is to inform all interested parties how the Commission intends to apply the principle and to establish guidelines for its application. The aim is also to provide input to the on-going debate on this issue both at EU and international level. The Communication underlines that the precautionary principle forms part of a structured approach to the analysis of risk, as well as being relevant to risk management. It covers cases where scientific evidence is insufficient, inconclusive or uncertain and preliminary scientific evaluation indicates that that there are reasonable grounds for concern that the potentially dangerous effects on the environment, human, animal or plant health may be inconsistent with the high level of protection chosen by the EU. Today's Communication complements the recently adopted White Paper on Food Safety and the agreement reached in Montreal this week-end on the Cartagena Protocol on Bio-safety.

The Communication also qualifies the measures that may be taken under the precautionary principle. Where action is deemed necessary, measures should be proportionate to the chosen level of protection, non-discriminatory in their application and consistent with similar measures already taken. They should also be based on an examination of the potential benefits and costs of action or lack of action and subject to review in the light of new scientific data and should thus be maintained as long as the scientific data remain incomplete, imprecise or inconclusive and as long as the risk is considered too high to be imposed on society. Finally, they may assign responsibility – or the burden of proof - for producing the scientific evidence necessary for a comprehensive risk assessment. These guidelines guard against unwarranted recourse to the precautionary principle as a disguised form of protectionism.

Today's Communication was presented to the Commission by Mr Erkki Liikanen, Enterprise and the Information Society Commissioner, Mr David Byrne, Health and Consumer Protection Commissioner, and Ms Margot Wallström, Environment Commissioner. It is a follow-up to President Romano Prodi's speech to the European Parliament on 5 October 1999.

The Communication recalls that a number of recent events have undermined the confidence of public opinion and consumers because decisions or absence of decisions were not supported by full scientific evidence and the legitimacy of such decisions was questionable.

The Commission has consistently striven to achieve a high level of protection, inter alia in the environmental and human, animal and plant health fields. It is the Commission's policy to take decisions aimed to achieve this high level of protection on a sound and sufficient scientific basis. However, where there are reasonable grounds for concern that potential hazards may affect the environment or human, animal or plant health, and when at the same time the lack of scientific information precludes a detailed scientific evaluation, the precautionary principle has been the politically accepted risk management strategy in several fields. Although the precautionary principle is not explicitly mentioned in the EC Treaty except in the environment field, the Commission considers that this principle has a scope far wider than the environment field and that it also covers the protection of human, animal and plant health.

The Communication makes it clear that the precautionary principle is neither a politicisation of science or the acceptance of zero-risk but that it provides a basis for action when science is unable to give a clear answer. The Communication also makes it clear that determining what is an acceptable level of risk for the EU is a political responsibility. It provides a reasoned and structured framework for action in the face of scientific uncertainty and shows that the precautionary principle is not a justification for ignoring scientific evidence and taking protectionist decisions.

The horizontal guidelines established in this Communication will provide a useful tool in the future for taking political decisions in this regard and will contribute to legitimate decisions taken when science is unable to assess completely the risk rather than decisions based on irrational fears or perceptions. Thus, one of the objectives of the Communication is to clearly describe the situations in which the precautionary principle could be applied and determining the scope of measures taken in this respect. It will therefore help ensuring the proper functioning of the Internal Market as well as a high level of protection and predictability for consumers and economic operators located in the EU and elsewhere.

COMMUNICATION FROM THE COMMISSION

ON THE PRECAUTIONARY PRINCIPLE

SUMMARY

1. The issue of when and how to use the precautionary principle, both within the European Union and internationally, is giving rise to much debate, and to mixed, and sometimes contradictory views. Thus, decision-makers are constantly faced with the dilemma of balancing the freedom and rights of individuals, industry and organisations with the need to reduce the risk of adverse effects to the environment, human, animal or plant health. Therefore, finding the correct balance so that the proportionate, non-discriminatory, transparent and coherent actions can be taken, requires a structured decision-making process with detailed scientific and other objective information.

2. The Communication's fourfold aim is to:

   - outline the Commission's approach to using the precautionary principle,
   - establish Commission guidelines for applying it,
   - build a common understanding of how to assess, appraise, manage and communicate risks that science is not yet able to evaluate fully, and
   - avoid unwarranted recourse to the precautionary principle, as a disguised form of protectionism.
   - It also seeks to provide an input to the ongoing debate on this issue, both within the Community and internationally.

3. The precautionary principle is not defined in the Treaty, which prescribes it only once - to protect the environment. But *in practice*, its scope is much wider, and specifically where preliminary objective scientific evaluation, indicates that there are reasonable grounds for concern that the potentially dangerous effects on the *environment*, *human, animal or plant health* may be inconsistent with the high level of protection chosen for the Community.

   The Commission considers that the Community, like other WTO members, has the right to establish the level of protection - particularly of the environment, human, animal and plant health, - that it deems appropriate. Applying the precautionary principle is a key tenet of its policy, and the choices it makes to this end will continue to affect the views it defends internationally, on how this principle should be applied.

4. The precautionary principle should be considered within a structured approach to the analysis of risk which comprises three elements: risk assessment, risk management, risk communication. The precautionary principle is particularly relevant to the management of risk.

   The precautionary principle, which is essentially used by decision-makers in the management of risk, should not be confused with the element of caution that scientists apply in their assessment of scientific data.

Recourse to the precautionary principle presupposes that potentially dangerous effects deriving from a phenomenon, product or process have been identified, and that scientific evaluation does not allow the risk to be determined with sufficient certainty.

The implementation of an approach based on the precautionary principle should start with a scientific evaluation, as complete as possible, and where possible, identifying at each stage the degree of scientific uncertainty.

5. Decision-makers need to be aware of the degree of uncertainty attached to the results of the evaluation of the available scientific information. Judging what is an "acceptable" level of risk for society is an eminently *political* responsibility. Decision-makers faced with an unacceptable risk, scientific uncertainty and public concerns have a duty to find answers. Therefore, all these factors have to be taken into consideration.

   In some cases, the right answer may be not to act or at least not to introduce a binding legal measure. A wide range of initiatives is available in the case of action, going from a legally binding measure to a research project or a recommendation.

   The decision-making procedure should be transparent and should involve as early as possible and to the extent reasonably possible all interested parties.

6. Where action is deemed necessary, measures based on the precautionary principle should be, *inter alia*:

   - *proportional* to the chosen level of protection,
   - *non-discriminatory* in their application,
   - *consistent* with similar measures already taken,
   - *based on an examination of the potential benefits and costs* of action or lack of action (including, where appropriate and feasible, an economic cost/benefit analysis),
   - *subject to review,* in the light of new scientific data, and
   - *capable of assigning responsibility for producing the scientific evidence* necessary for a more comprehensive risk assessment.

   Proportionality means tailoring measures to the chosen level of protection. Risk can rarely be reduced to zero, but incomplete risk assessments may greatly reduce the range of options open to risk managers. A total ban may not be a proportional response to a potential risk in all cases. However, in certain cases, it is the sole possible response to a given risk.

   Non-discrimination means that comparable situations should not be treated differently, and that different situations should not be treated in the same way, unless there are objective grounds for doing so.

   Consistency means that measures should be of comparable scope and nature to those already taken in equivalent areas in which all scientific data are available.

   Examining costs and benefits entails comparing the overall cost to the Community of action and lack of action, in both the short and long term. This is not simply an economic cost-benefit analysis:

its scope is much broader, and includes non-economic considerations, such as the efficacy of possible options and their acceptability to the public. In the conduct of such an examination, account should be taken of the general principle and the case law of the Court that the protection of health takes precedence over economic considerations.

Subject to review in the light of new scientific data, means measures based on the precautionary principle should be maintained so long as scientific information is incomplete or inconclusive, and the risk is still considered too high to be imposed on society, in view of chosen level of protection. Measures should be periodically reviewed in the light of scientific progress, and amended as necessary.

Assigning responsibility for producing scientific evidence is already a common consequence of these measures. Countries that impose a prior approval (marketing authorisation) requirement on products that they deem dangerous *a priori* reverse the burden of proving injury, by treating them as dangerous unless and until businesses do the scientific work necessary to demonstrate that they are safe.

Where there is no prior authorisation procedure, it may be up to the user or to public authorities to demonstrate the nature of a danger and the level of risk of a product or process. In such cases, a specific precautionary measure might be taken to place the burden of proof upon the producer, manufacturer or importer, but this cannot be made a general rule.

Greater Dublin Drainage Project

SID Application

ABP Case file 312131

Appendix Reference:

3.1

Appendix Description:

Sabrina Joyce-Kemper submission 7th June 2024

MARCON COMPUTATIONS INTERNATIONAL
Advanced Engineering and Environmental Solutions

Alternate Site Assessment

Numerical Modelling Report

GP201103_doc001_04

Document No: GP201103_doc001.pdf
Status: Draft_04

Table of Contents

Table of Figures

Table of Tables

Introduction

MarCon were commissioned by Jacobs Ireland to undertake a mathematical modelling study of the coastal waters of north County Dublin to determine the preferable location(s) for a marine outfall, and the possible impacts on the receiving waters of discharging treated effluent through that outfall, pursuant to the Greater Dublin Drainage project.

This report details the preliminary modelling study and appraisal undertaken to determine the dispersal conditions from a range of outfall locations in order to progress the detailed modelling and land based work. The preliminary modelling study has been based on currently available information.

This preliminary modelling study assumes a conservative virtual tracer, and no complexity of boundary conditions. It does not account for ambient concentrations of water quality parameters, nor the temporal variation in input loads from other outfalls or rivers. Further, the preliminary modelling study does not account for biogeochemical processes which would impact on the ambient nutrient levels in the coastal waters, nor does it account for the decay rates of coliforms.

Following completion of the onsite marine hydrographic surveys the next phase of the modelling study will commence. The next phase will incorporate near-field dilution characteristics of proposed outfall diffuser characteristics, take into account factors which impact on die off of microbial indicators and account for biogeochemical processes which would impact on the ambient nutrient levels in the coastal waters.

A three dimensional hydrodynamic and solute transport model, ECOMSED (**E**stuarine, **C**oastal & **O**cean **M**odel: **Sed**iments) of the coastal waters of north County Dublin was developed at a resolution of 200m to predict the circulation patterns and the transport of outfall effluent plumes throughout the region.

The results from the preliminary modelling study identified the preferable location(s) for the marine outfall and portrayed the dispersion patterns and concentrations of the effluent discharges from each outfall. The threshold of potential impacts on the sensitive receptors and designated areas are at this stage merely indicative of expected target dilutions having regard to hydrodynamic characteristics of the offshore zones

The description of the mathematical model, the development of same for north County Dublin, and preliminary calibration of the model is presented in Section 2. The methodology for the Alternative Site Assessment solute transport modelling is presented in Section 3. The results of the Alternative Site Assessment solute transport modelling are presented in Sections 4 & 5.

Numerical Model

The ECOMSED (**E**stuarine, **C**oastal & **O**cean **M**odel: **Sed**iments) model as used in this study is is a state-of-the-art hydrodynamic, sediment and solute transport model which realistically computes water circulation, temperature, salinity, and mixing and transport of conservative parameters, deposition and re-suspension of cohesive and non-cohesive sediments.

The model ECOMSED has its origins in the mid 1980's with the creation of the Princeton Ocean Model (Blumberg and Mellor, 1987) and its version for shallow water environments – rivers, bays, estuaries and the coastal ocean and reservoirs and lakes- named ECOM (Blumberg, 1996). .

During the last several years, ECOMSED was enhanced to include generalized open boundary conditions, tracers, better bottom shear stresses through a sub-model for bottom boundary layer physics, surface wave models, non-cohesive sediment transport, and dissolved and sediment-bound tracer capabilities.

Model performance has been evaluated by appealing to a large series of simple test cases designed to isolate specific processes and by application of the model to many real-world situations. There have been over 500 journal articles written that are based on the use of the various ECOMSED sub-models.

The ECOMSED model belongs to that class of models where model realism is an important goal and addresses meso-scale phenomena; that is activity characterized by 1-100 km length and tidal-30 day time scales commonly observed in estuaries and the coastal ocean.

The module is a three-dimensional coastal ocean model, incorporating a turbulence closure model to provide a realistic parameterization of the vertical mixing processes. The prognostic variables are the three components of velocity, temperature, salinity, turbulence kinetic energy, and turbulence macro-scale.

The momentum equations are nonlinear and incorporate a variable Coriolis parameter. Prognostic equations governing the thermodynamic quantities, temperature, and salinity account for water mass variations brought about by highly time-dependent coastal up-welling / down-welling processes as well as horizontal advective processes.

Free surface elevation is also calculated prognostically, with only some sacrifice in computational time so that tides and storm surge events can also be simulated. This is accomplished by use of a mode splitting technique whereby the volume transport and vertical velocity shear are solved separately.

Other computing variables include density, vertical eddy viscosity, and vertical eddy diffusivity. The module also accommodates realistic coastline geometry and bottom topography.

Model Development

The mathematical modelling study was carried out by developing numerical models to simulate both the water circulation throughout the model domain and the transport of material from the proposed outfall locations.

The water circulation model of the coastal waters of north County Dublin was developed at a horizontal grid resolution of 200m. The study area of the model extends in a south to north direction from 53.375°N to 53.625°N, (Howth Head to Balbriggan), and in a west to east direction from 6.200°W to 5.875°W.

The model resolution of 200m was chosen to facilitate relatively short run times whilst at the same time providing sufficient resolution to capture the predominant coastal circulation patterns.

The seabed bathymetry for the model was digitised from the following UKHO Admiralty Charts;
0044: "Nose of Howth to Ballyquintin Point",
1468: "Arklow to the Skerries Islands",
0633(B): "Skerries Islands",
0633(E): "Malahide Inlet",
0633(F): "Rogerstown Inlet",
1415(A): "Howth Detail"

This dataset was augmented with the most recent bathymetry available from the Irish seabed survey INFOMAR project. The resulting finite difference grid defined to the numerical model consisted of a model domain of 108 x 140 cells with 10No. sigma levels specified in the vertical.

The extent of the north Co. Dublin coastal model domain, and the underlying bathymetry, is presented in Figure 1.

Figure 1: Extent of North County Dublin coastal model and underlying bathymetry.

The model operates at a 36 second timestep during three dimensional calculations, and a 3 second timestep during two dimensional calculations. All water elevation, current speeds, directions and dissolved parameters are calculated throughout the model domain, providing a very highly resolved temporal prediction capability.

The model features two open sea boundaries at the north and south of the study area where tidal constituents acquired from the FES2004 global tidal model were used to generate time varying water surface elevations to induce tidal circulation within the model domain.

The FES2004 is a global tide model which assimilates both tide gauges and altimeter data to provide amplitudes and phases of 15 tidal constituents at a $1/8^{o}$ latitude and longitude grid resolution.

Six major tidal constituents, namely, M2, N2, S2, O1, K1, and P1 were applied, with the FES2004 $1/8^{o}$ data interpolated along the north and south boundaries of the model to obtain spatially varying amplitudes and phases of the above constituents.

The predominant direction of the flooding and ebbing tides at the eastern extent of the model domain run parallel to the coast, as indicated by the UKHO Tidal Stream Atlas for the Irish Sea. Therefore, the model has one streamline boundary specified along the eastern boundary of the model.

The current speeds and directions as predicted by the model were calibrated against the UKHO tidal stream diamond B, (Malahide Inlet), on UKHO Admiralty Chart No. 0044. The water surface elevations predicted by the model were calibrated against the Irish Marine Institute tide gauges at Howth and Skerries.

As the spread and fate of a solute in water is dependant on the local water circulation patterns, the ECOMSED solute transport model developed in this study uses the output from the hydrodynamic module to compute concentrations of the various parameters in the water column.

The solute transport model is based in the classic three dimensional mass transport equation and includes terms for local effects (volume changes), transport by advection, horizontal and vertical dispersion, turbulent diffusion, source (or sink) terms, decay (or growth) terms and kinetic biochemical transformation effects, details of which are proved in Appendix II: ECOMSED Reference Manual.

Model Calibration

Calibration involves the adjustment of model parameters and forcing functions within the bounds of modelling uncertainties to obtain the best possible approximation of the physical phenomena being simulated.

The model predictions of current speeds were calibrated against the UKHO tidal streams diamond B, (Malahide Inlet), on Admiralty Chart No. 0044.

The model predictions of water surface levels were calibrated against the Irish Marine Institutes recording tide gauges at Howth and Skerries.

The locations at which the model predictions were calibrated against the tidal stream diamond and tide gauges at Howth and Skerries are presented in Figure 2.

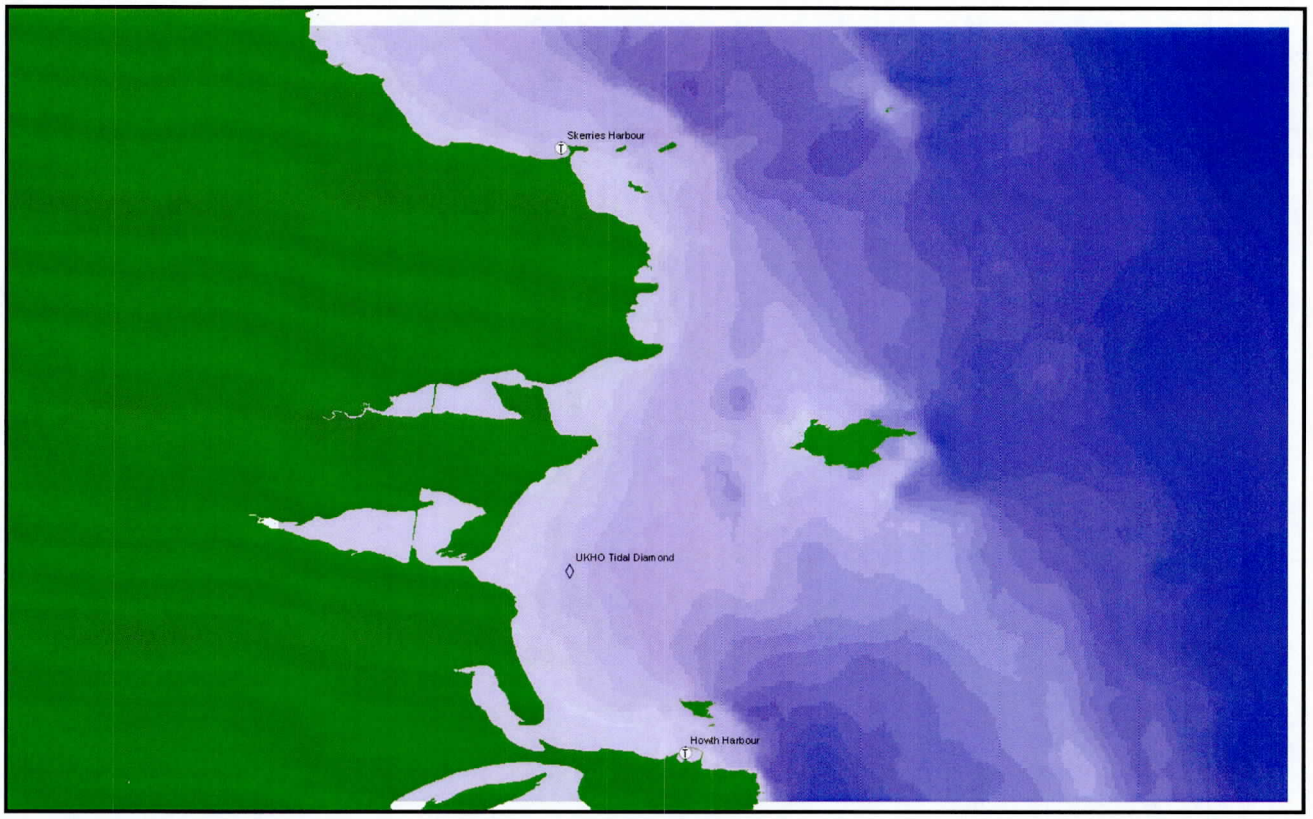


Figure 2: Model calibration locations.

Figure 3 and Figure 4 presented comparisons of water surface levels as predicted by the numerical model against the recorded tidal levels at the Howth tide gauge for the months of May 2010 and October 2010 respectively.

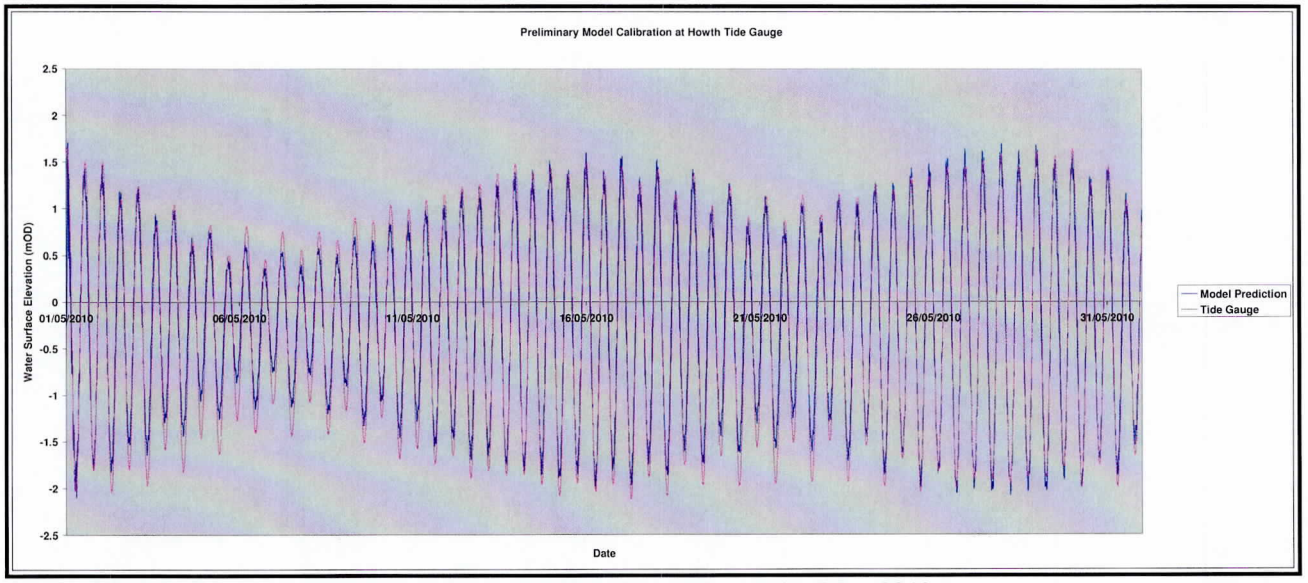


Figure 3: Preliminary water surface elevation calibration at Howth for May 2010

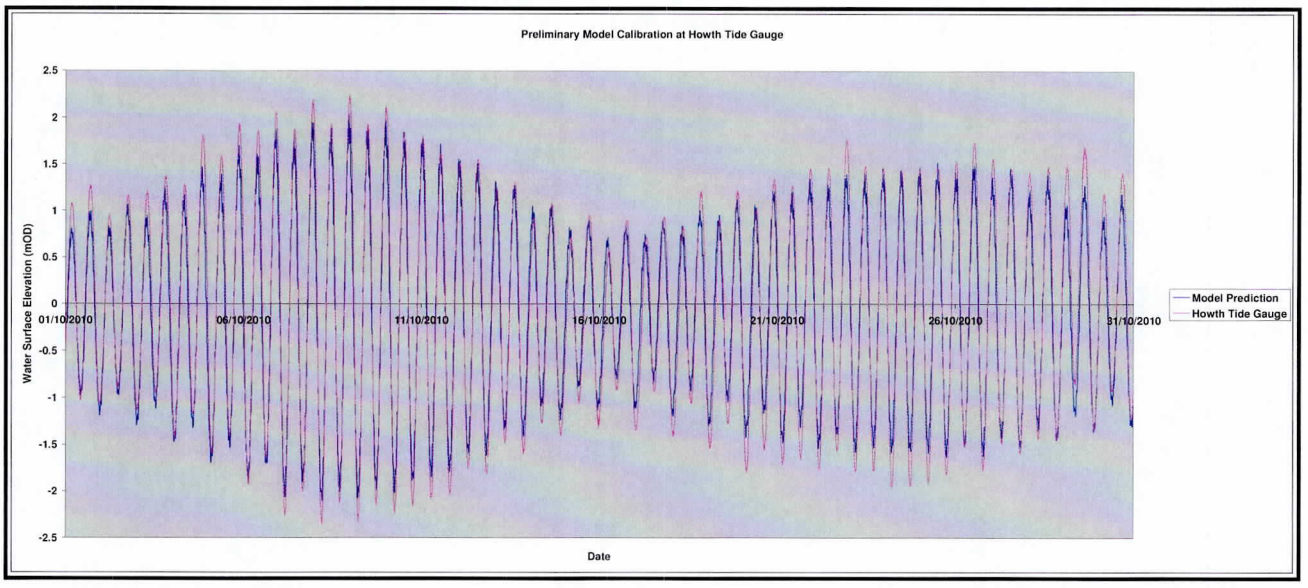


Figure 4: Preliminary water surface elevation calibration at Howth for October 2010

Figure 5 and Figure 6 presented comparisons of water surface levels as predicted by the numerical model against the recorded tidal levels at the Skerries tide gauge for the months of May 2010 and October 2010 respectively.

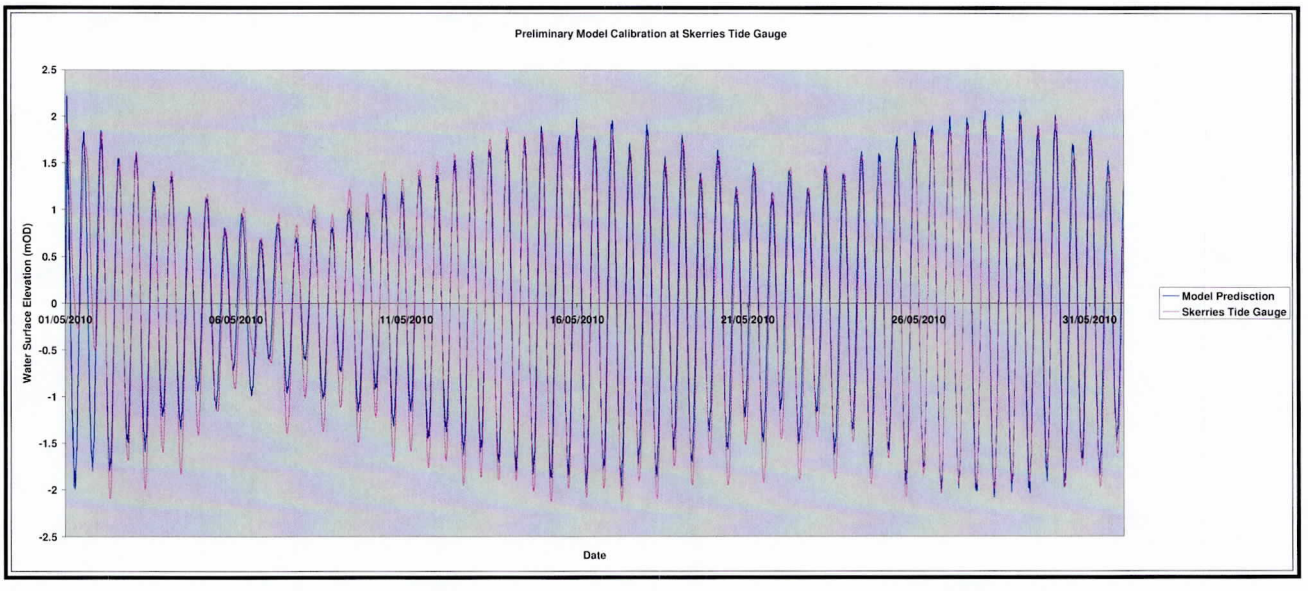


Figure 5: Preliminary water surface elevation calibration at Skerries for May 2010

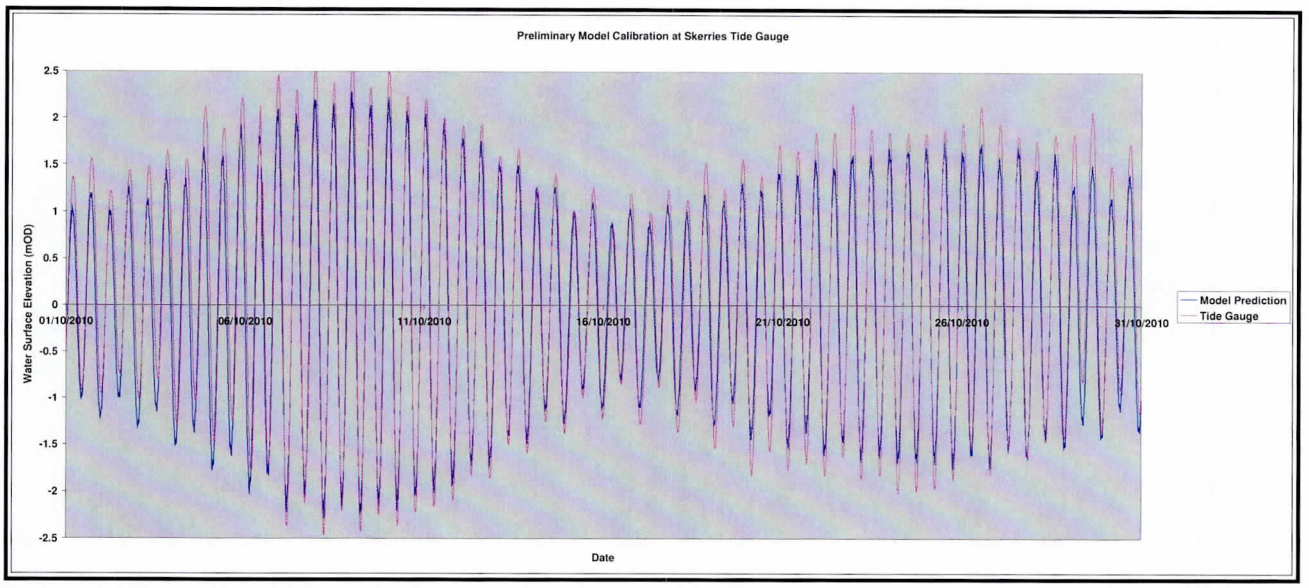


Figure 6: Preliminary water surface elevation calibration at Skerries for October 2010

Figure 7 presents the comparison of current speeds as predicted by the numerical model over the neap to spring tidal cycle during the month of May 2010 against the representative tidal stream diamond values for neap and spring tides respectively..

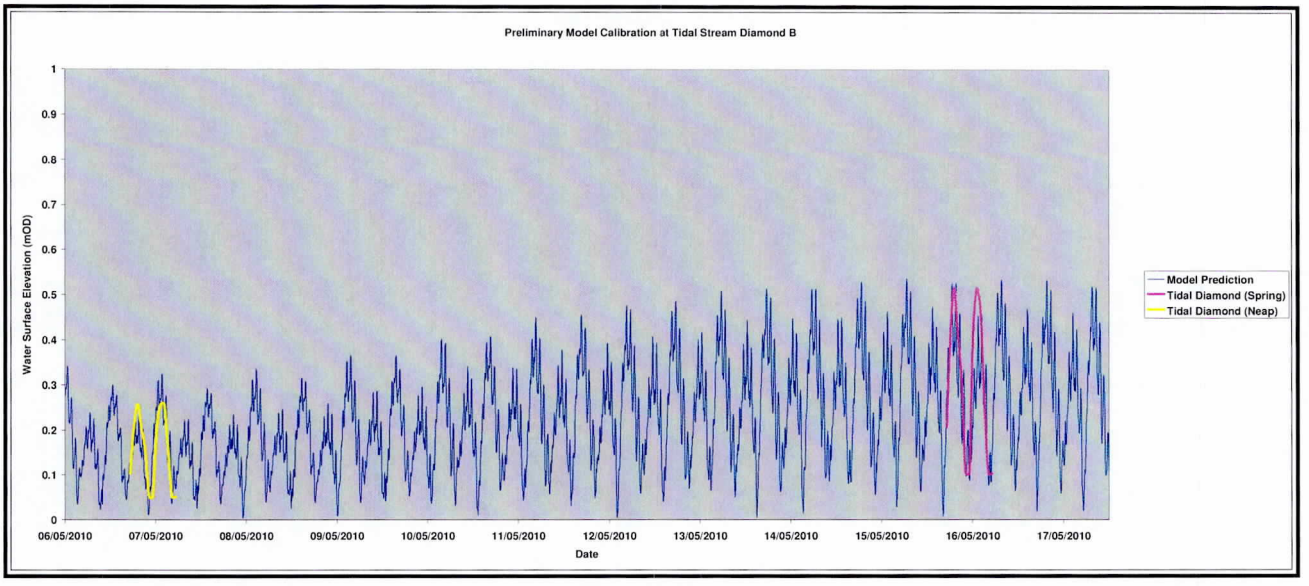


Figure 7: Preliminary current velocity calibration at Tidal Diamond B.

Figure 16 through Figure 23, in Appendix II, present the predicted current velocity vectors from the numerical model at four stages of the tide, namely, high water, mid ebb, low water and mid flood for both a neap tide and a spring tide off the north County Dublin coastline.

Calibration Discussion

In general, the comparison between model predictions and available data showed good agreement. However, a number of points should be noted.

1. Current speed calibration shows very good agreement between model predictions and data from the UKHO tidal stream diamonds. However, the UKHO data is, at best, representative of current speeds for mean spring tide and mean neap tide conditions. It does not provide data regarding variability of current speeds for different tidal ranges, nor any data regarding current speeds over depth.

2. Water surface level calibration shows good agreement between model predictions and tide gauge data from Howth tide gauge. The model accurately predicts the timings of high water and low water, and the phasing between spring tides and neap tides. The model also predicts closely the magnitude of the water surface levels, generally to within +/- 0.1m though on neap tides during May, the low water level is under-predicted by as much as 0.4m.

3. Similarly, water surface level calibration shows good agreement between model predictions and tide gauge data from Skerries tide gauge. The model accurately predicts the timings of high water and low water, and the phasing between spring tides and neap tides. The model also predicts closely the magnitude of the water surface levels, generally to within +/- 0.1m though on neap tides, the low water level is under-predicted by as much as 0.4m. At high water during October, the water level is under-predicted by approximately 0.2m, though the neap tides are within +/- 0.1m

4. One of the main causes for the deviation of recorded tide levels from the theoretical harmonic tidal levels is the role atmospheric pressure plays regulating sea surface height. An increase or decrease of 1 millibar (mb) in barometric pressure will cause a 1cm fall or rise in sea surface level in the absence of any tides. Barometric pressure can vary from 960mb to 1040mb, representing a change in water surface level of 0.8m.

5. The model was not forced with temporally varying atmospheric pressure at the sea surface as no such dataset was available at the time of the study. Therefore the fluctuations in the tide gauge records could not be re-created in the numerical model, explaining in some part the discrepancies between model predictions and recorded data.

Alternate Site Assessment Methodology

The primary objective of the current modelling study was to determine the preferable location(s) to site a marine outfall off the coast of north County Dublin based on the impact of each outfall on a number of environmentally sensitive areas.

Environmentally Sensitive Areas

The environmentally sensitive areas assessed in the current study, and presented in Figure 8, are:

- **Special Areas of Conservation (SACs)**
  - Baldoyle Bay
  - Howth Head
  - Ireland's Eye
  - Lambay Island
  - Malahide Estuary
  - Rogerstown Estuary

- **Bathing Waters Beaches**
  - Sutton Burrow beach
  - Skerries (south beach)
  - Rush (south beach)
  - Portrane (Brook beach)
  - Portmarnock beach
  - Malahide beach
  - Loughshinny beach
  - Donabate (Balcarrick beach)
  - Balbriggan (Front Strand beach)

- **Shellfish Waters**
  - Balbriggan
  - Malahide

- **Natural Heritage Areas (NHAs)**
  - Skerries Islands

- **Special Protected Areas (SPAs)**
  - Baldoyle Bay
  - Rockabill
  - Skerries Islands
  - Rogerstown Estuary
  - Lambay Island
  - Malahide Estuary
  - Ireland's Eye
  - Howth Head Coast

- **Proposed Natural Heritage Areas (pNHAs)**
  - Rockabill Island
  - Loughshinny Coast
  - Rogerstown Estuary
  - Portraine Shore
  - Lambay Island
  - Malahide Estuary
  - Baldoyle Bay
  - Ireland's Eye
  - Howth Head

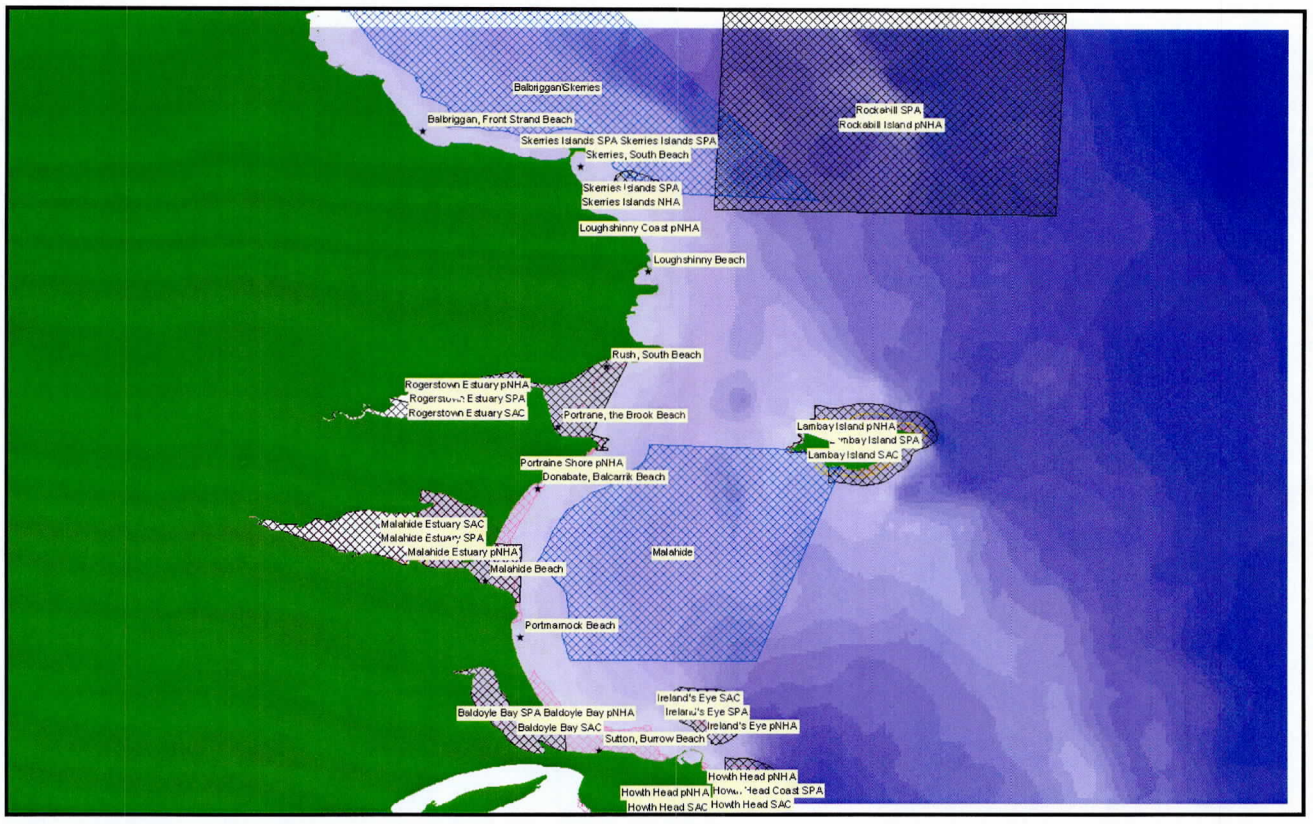


Figure 8: Location of environmentally sensitive areas in model domain.

Model Scenarios

A series of model scenarios were undertaken, simulating the discharge of a conservative tracer from each of the potential outfall locations. A total of 80No. potential outfall locations were specified to the numerical model for evaluation. The locations of the potential outfalls in relation to the environmentally sensitive areas are presented in Figure 9.

In assessing each outfall, a constant discharge rate of 7.0m^3/s with a constant 100mg/l concentration of conservative tracer was specified as discharging through the potential outfall location at the seabed. The density of the discharge was specified as the ambient seawater density.

The simulation period of each outfall assessment scenario was defined as 360 hours, corresponding to 15 days of a repeating spring-neap-spring tidal cycle. Each simulation commenced at high water on the first spring tide.

Each potential outfall commenced discharging from the seabed at hour 25 of the simulation, corresponding to high water during the second tidal cycle on the spring tide, and thereafter discharged continuously until hour 360 of the simulation.

The concentration of the conservative tracer throughout the model domain was saved as snapshots in time at hourly intervals over a neap tidal cycle (hours 174 – 187 of simulation) and again at hourly intervals over a spring tidal cycle (hours 347-360 of simulation).

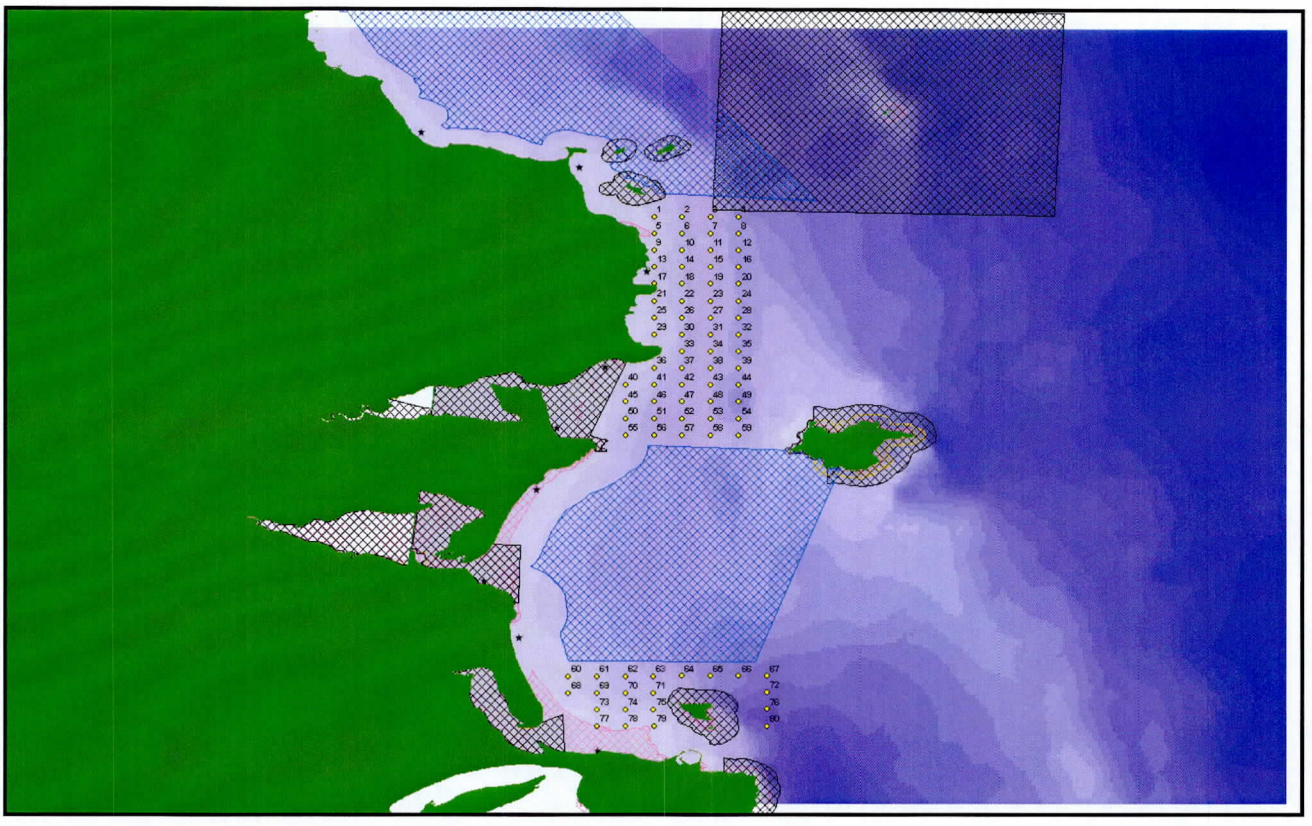


Figure 9: Potential outfall locations within model domain.

Impact Assessment

The total mass of conservative tracer in each numerical model cell within each environmentally sensitive area was calculated from the saved hourly snapshots, at hourly intervals according to the equation:

$$M_h = \sum_{i=1}^{ncells} C_{i,h}.V_{i,h}$$

where: M_h = mass, (mg), of conservative tracer in the environmentally sensitive area at hour h

ncells = number of numerical model cells within the environmentally sensitive area

$C_{i,h}$ = concentration, (mg/l), of conservative tracer in the numerical model cell i, at hour h.

$V_{i,h}$ = volume, (l), water in the numerical model cell i, at hour h.

The average concentration of conservative tracer within each of the environmentally sensitive areas for the hour in question was then calculated according to:

$$\overline{C}_h = M_h / V_{Th}$$

where: $\overline{C}_h$ = average concentration, (mg/l), of conservative tracer within the environmentally sensitive area at hour h.

V_{Th} = total volume, (l), of water in the environmentally sensitive area at hour h, and is given by:

$$V_{Th} = \sum_{i=1}^{ncells} V_i$$

The average concentration of the conservative tracer within the environmentally sensitive area over the course of both a neap and spring tidal cycle was calculated according to:

$$\overline{C} = \sum_{h=1}^{13} \overline{C}_h \Big/ 13$$

Where: $\overline{C}$ = average concentration, (mg/l), of conservative tracer within the environmentally sensitive area over the course of a tidal cycle.

h = number of hours in tidal cycle.

Note: Model outputs were archived at hourly intervals in the current study, therefore average concentration over the course of a tidal cycle were calculated over 13hrs, rather than 12.4hrs.

This methodology was repeated for each of the 35No. environmentally sensitive areas for each of the 80No. potential outfall locations. This assessment resulted in the creation of a 35 x 80 matrix, for both neap and spring tides, of the average concentration in each environmentally sensitive area as a result of discharging from each of the potential outfall locations.

Results

Solute Plume Snapshots

The effluent plumes from a sample number of the assessed outfall locations are presented in Appendix III: Solute Transport Results, showing the extent of the plumes from each outfall at mid-ebb, low water, mid-flood and high water on both a neap and a spring tide.

The outfalls chosen for inclusion in Appendix II: Solute Transport Results are:

- Outfall Location No.1 - nearshore outfall to the north of the study area;
- Outfall Location No.4 - offshore outfall to the north of the study area;
- Outfall Location No.55 – nearshore outfall near the centre of the study area;
- Outfall Location No.59 – offshore outfall near the centre of the study area;
- Outfall Location No.68 – nearshore outfall to the south of the study area;
- Outfall Location No.72 – offshore outfall to the south of the study area.

and are presented in Figure 10, below.

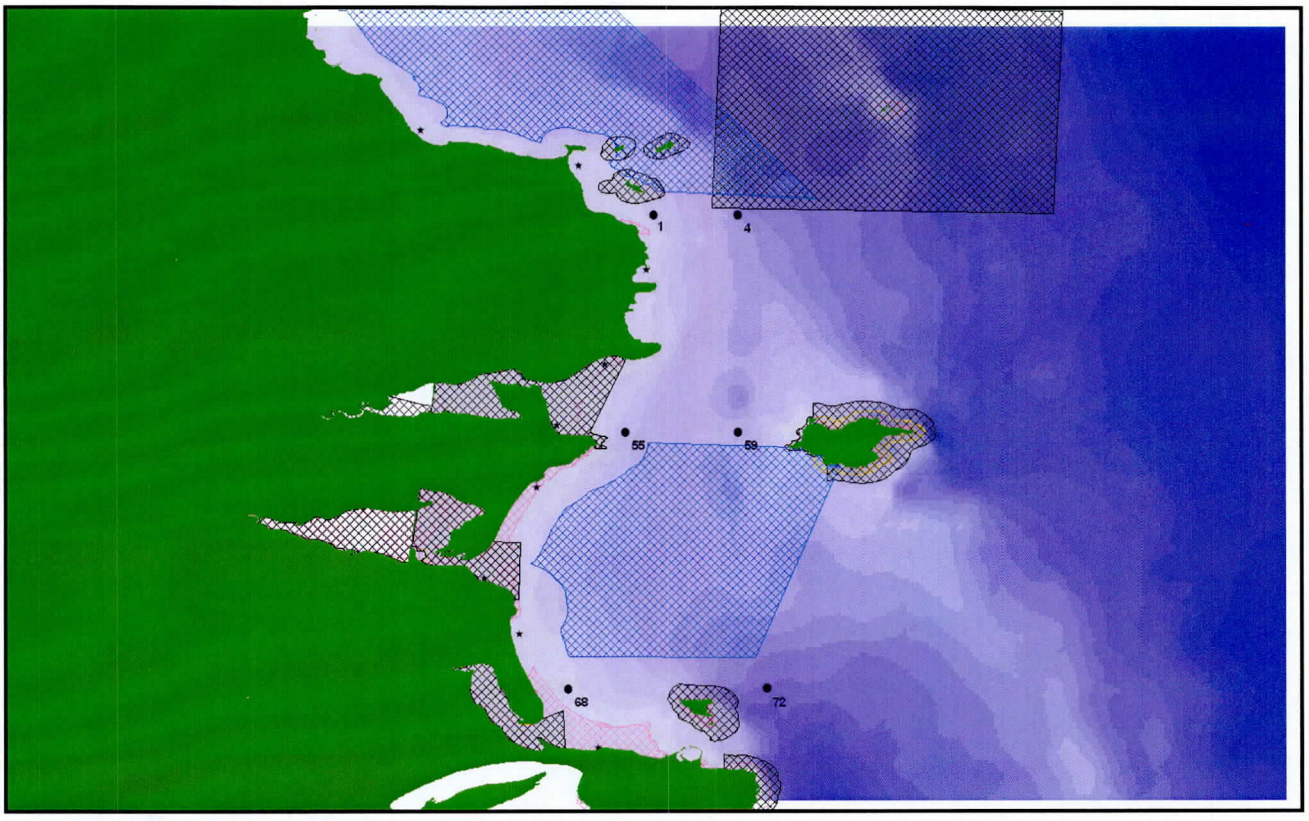


Figure 10: Outfall Locations chosen for visualisation in Appendix III: Solute Transport Results

Alternative Site Assessment Results

The methodology presented in the preceding section outlined the manner in which the magnitude of impact on each environmentally sensitive area, arising from discharging from each of the 80No. outfalls, was determined.

The magnitude of the impact was defined as the average concentration of a conservative tracer over both a neap tide and a spring tide within each environmentally sensitive area.

Presented in this section are the results of the alternate site assessment. The results are presented in terms of the neap tide and spring tide 35 x 80 assessment matrices representing the average concentration within each environmentally sensitive area as a result of discharging from each of the 80No. potential outfall locations. Figure 11 presents the assessment matrix for a neap tide, while Figure 12 presents the assessment matrix for a spring tide.

For clarity, only the combinations where an outfall had an impact magnitude above 0.01 mg/l on an environmentally sensitive area are colour coded. Any combination of outfall and environmentally sensitive area where the magnitude of the impact was <0.01 mg/l is coloured light gray. The data used to construct the neap and spring assessment matrices are included in Appendix I

An arbitrary impact magnitude limit of 0.5mg/l was chosen against which to assess the outfalls. Any outfall which resulted in an impact of >0.5mg/l within any individual environmentally sensitive area was removed from the analysis. The result of this removal of outfalls from the analysis is presented graphically in Figure 13 and Figure 14, below.

The outfalls were further separated into two geographical groups; northern outfalls being those outfalls located above the Malahide designated shellfish waters (Outfalls 1-59), and southern outfalls being those outfalls located below the Malahide designated shellfish waters (Outfalls 60 – 80).

Impacts on environmental sensitive areas from all outfall locations were seen to be at their greatest during neap tide conditions, reflecting the reduced dilution and dispersion capacity when compared with spring tidal conditions. Therefore the preferable outfall locations for the marine outfall are those outfalls that passed the neap tide assessment criteria, thus resulting in the lowest environmental impact, and are presented below in Figure 15, for both northern and southern outfall regions.

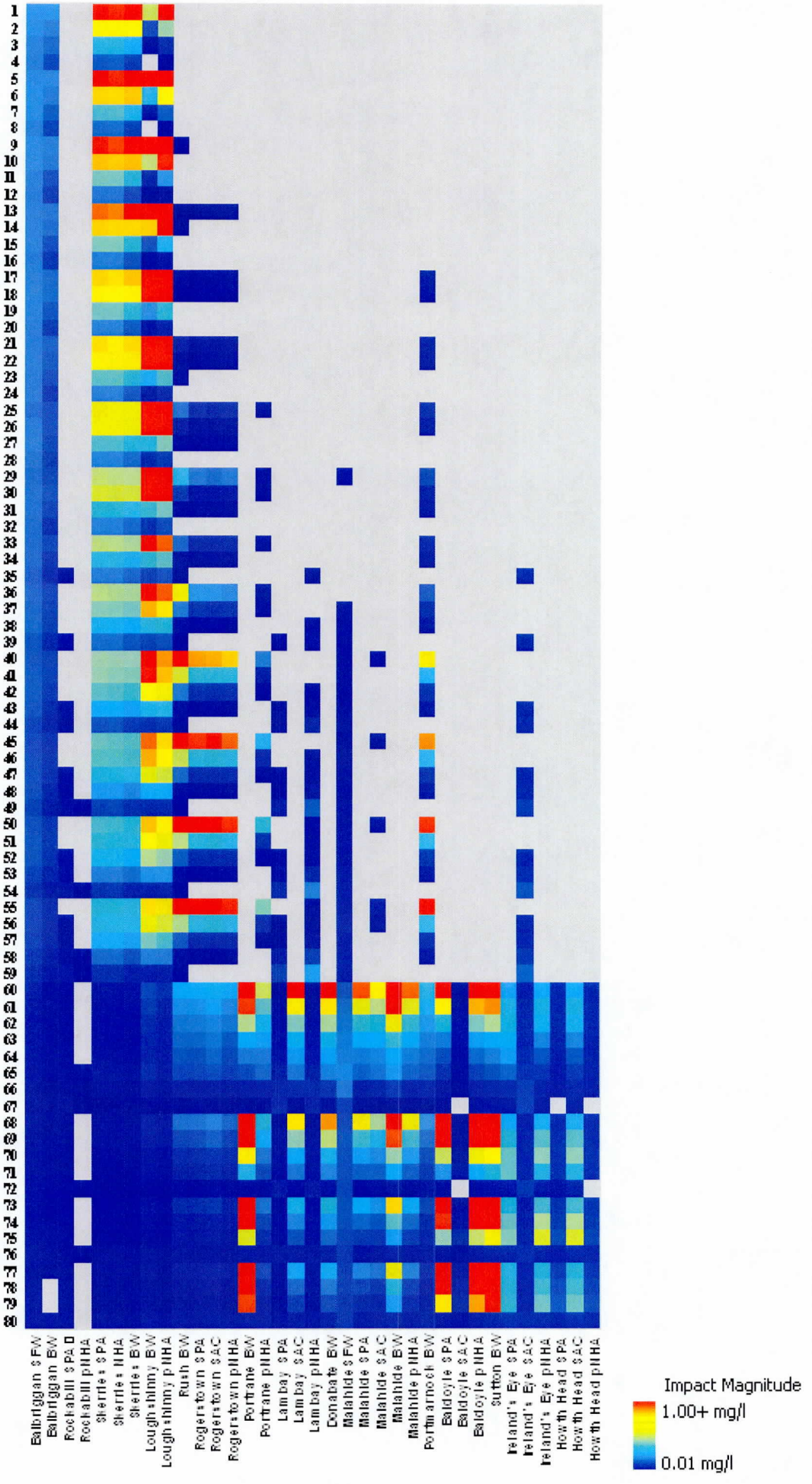


Figure 11: Neap Tide Assessment Matrix

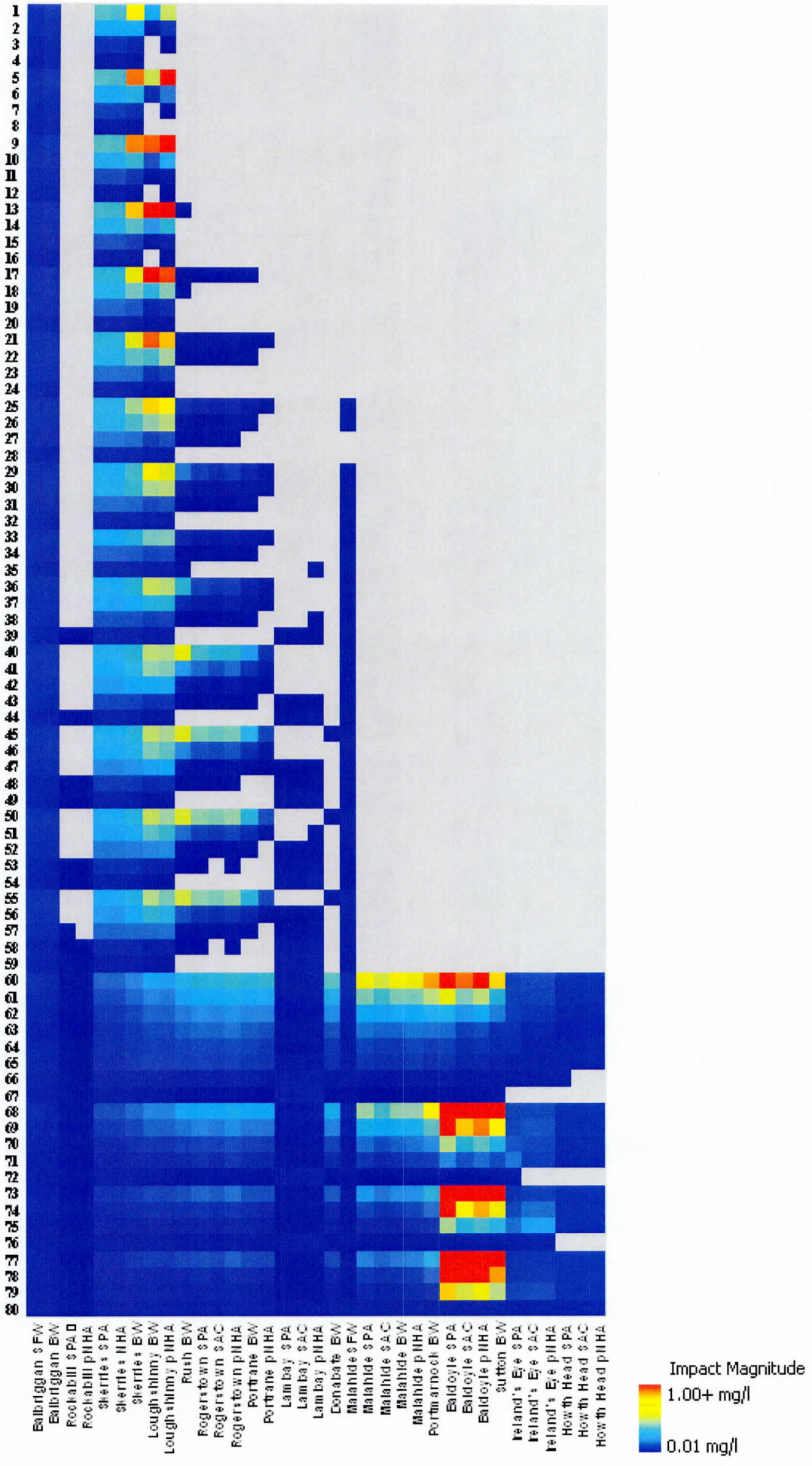


Figure 12: Spring Tide Assessment Matrix

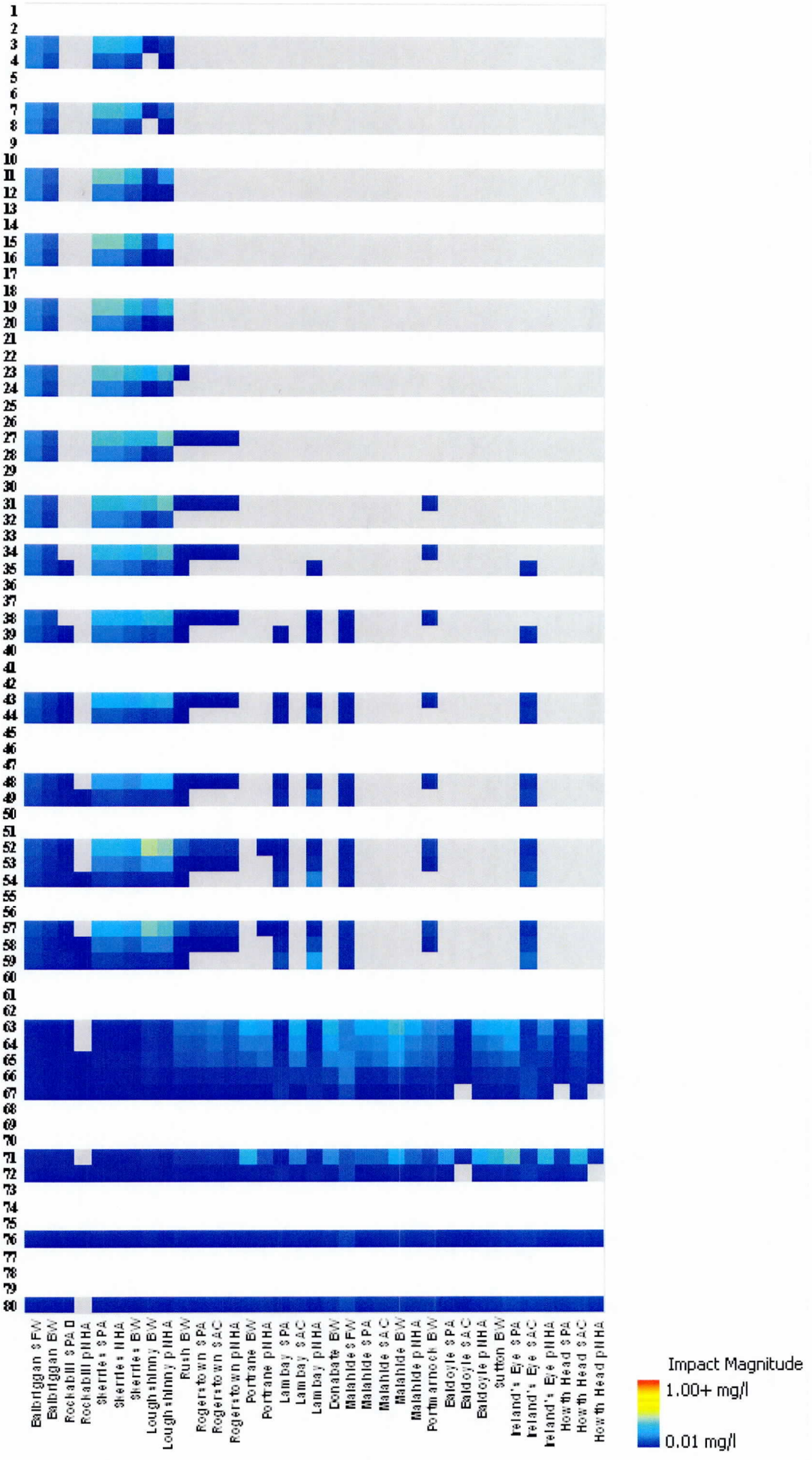


Figure 13: Neap Tide Assessment Matrix with outfalls removed

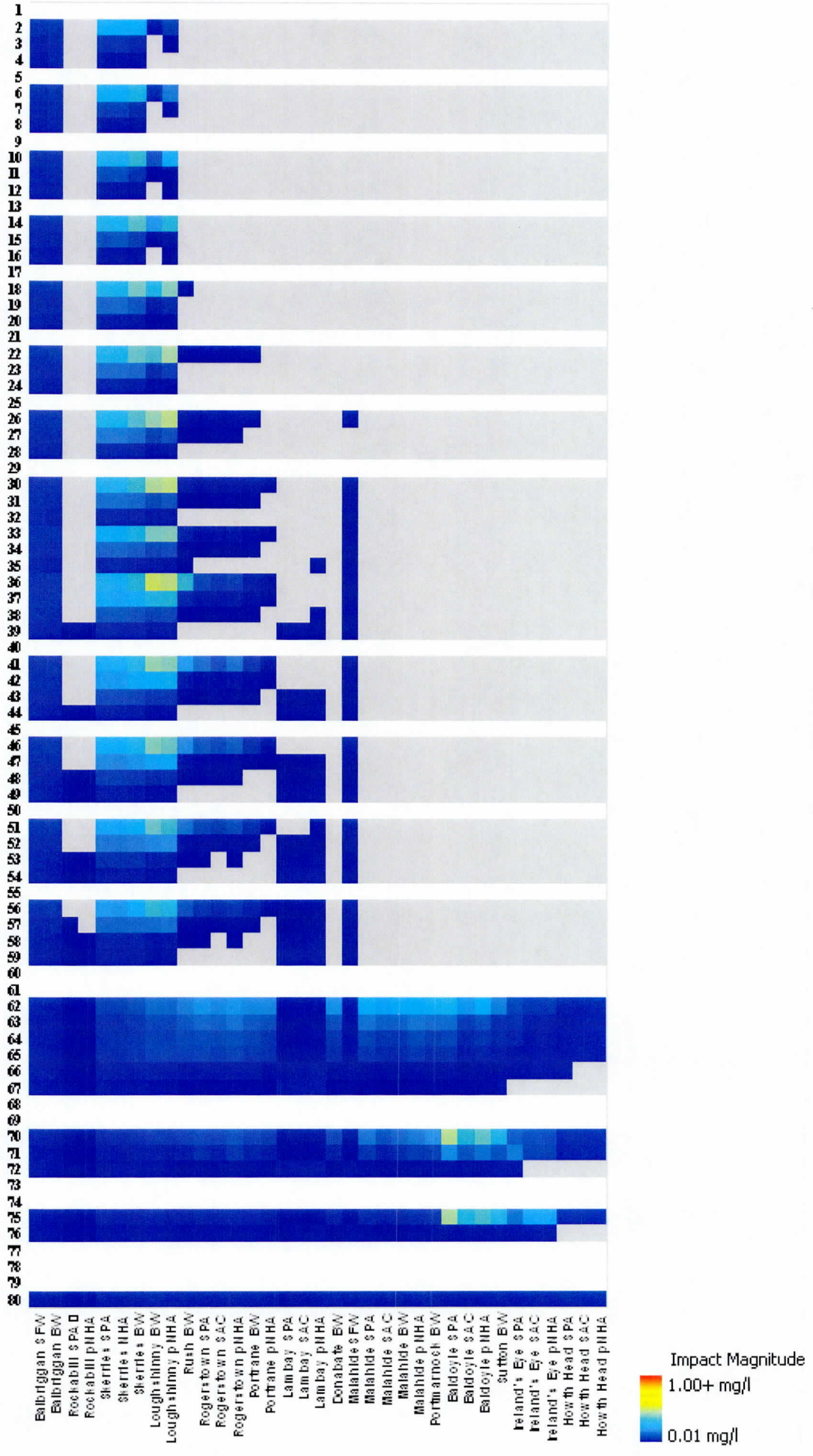


Figure 14: Spring Tide Assessment Matrix with outfalls removed

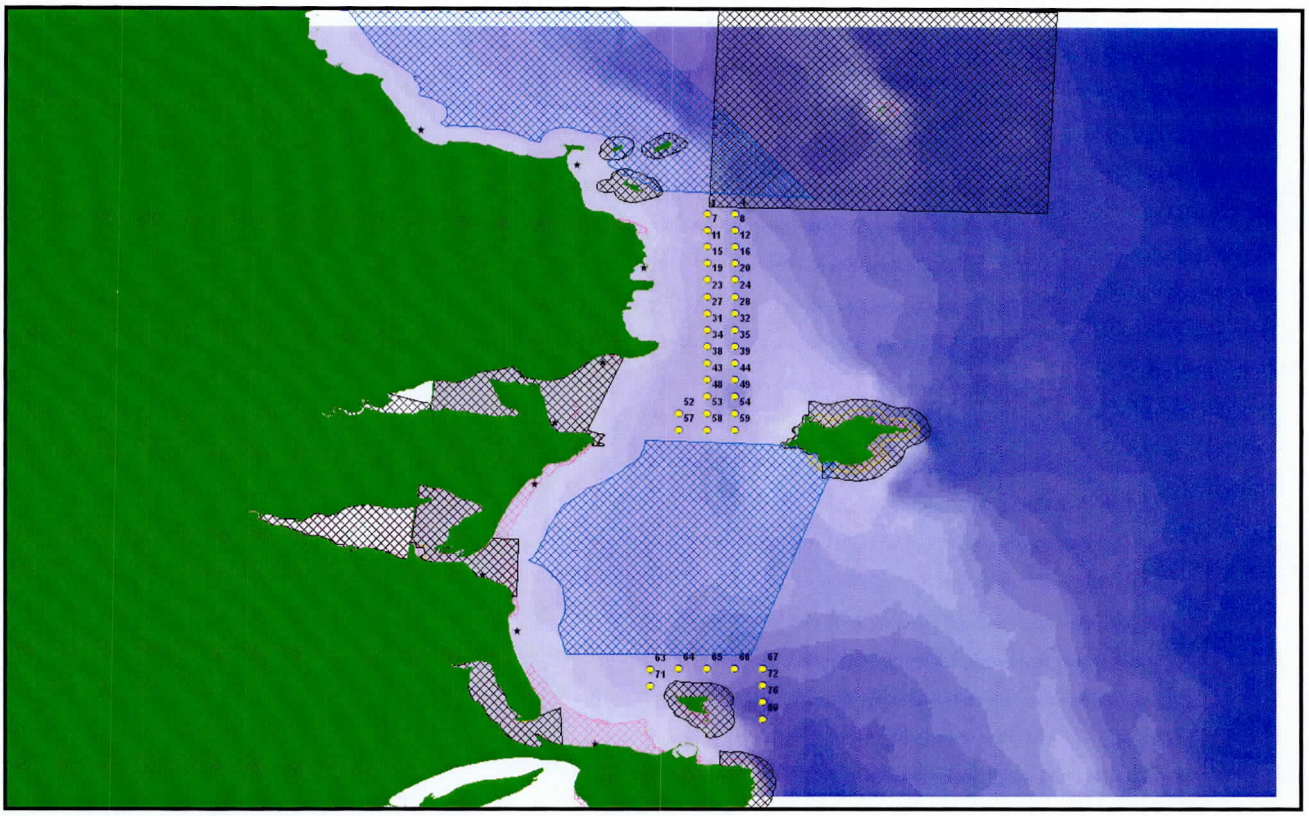


Figure 15: Range of outfall locations with lowest environmental impact

Conclusions

A hydrodynamic and solute transport modelling study has been undertaken to predict the general hydrodynamic circulation patterns of the coastal waters off north County Dublin using a three dimensional numerical model.

The modelling study was used to determine the preferable location(s) off the coast of north County Dublin for a proposed new treated effluent outfall. The preferable outfall location(s) were classified as those that resulted in an arbitrary impact magnitude of < 0.5mg/l on any environmental sensitive area over a neap tidal cycle or a spring tidal cycle.

The water surface levels and current speeds as predicted by the modelling study were compared against representative data from the Irish Marine Institute tide gauges and United Kingdom Hydrographic Office (UKHO) Admiralty Charts and, for the most part, showed good agreement. Ideally, the model should be calibrated against a comprehensive dataset of recorded field data, but to date no such information has been collected.

The modelling study did not account for the ambient water quality of the coastal waters, nor any material entering the coastal waters from other outfalls or rivers discharging to the study area. However, the contribution from these sources will not change with respect to the location of the new outfall.

The modelling study did not examine the transport and fate of microbial parameters, nor the complex interaction of the various nutrients in the effluent discharging through the outfall. A full water quality dispersion modelling study will be undertaken in the next phase of the project to quantify the magnitude of impacts on the various sensitive receptors for a range of determinands of concern.

The modelling study found that for northern part of the study region (north of Malahide shellfish waters designation), the preferable outfall location(s) lay within a range of 1km – 2km offshore, with preferable location improving slightly in a northerly direction towards Skerries.

The modelling study found that for southern part of the study region (south of Malahide shellfish waters designation), the preferable outfall location(s) lay approximately 1km off Irelands Eye, to both the north and east of the island.

Appendix I: Assessment Matrices

Outfall No.	Balbriggan SFW	Balbriggan BW	Rockabill SPA	Rockabill pNHA	Skerries SPA	Skerries NHA	Skerries BW	Loughshinny BW	Loughshinny pNHA	Rush BW	Rogerstown SPA	Rogerstown SAC	Rogerstown pNHA	Portrane BW	Portrane pNHA	Lambay SPA	Lambay SAC	Lambay pNHA	Donabate BW	Malahide SFW	Malahide SPA	Malahide SAC	Malahide BW	Malahide pNHA	Portmarnock BW	Baldoyle SPA	Baldoyle SAC	Baldoyle pNHA	Sutton BW	Ireland's Eye SPA	Ireland's Eye SAC	Ireland's Eye pNHA	Howth Head SPA	Howth Head SAC	Howth Head pNHA
1	0.20	0.21	0.00	0.00	0.97	0.94	1.31	0.49	1.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.20	0.18	0.00	0.00	0.67	0.67	0.68	0.13	0.43	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.19	0.16	0.00	0.00	0.31	0.32	0.25	0.02	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.18	0.13	0.00	0.00	0.15	0.15	0.11	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.20	0.20	0.00	0.00	0.98	0.95	1.42	1.12	3.63	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.20	0.18	0.00	0.00	0.75	0.74	0.77	0.28	0.70	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	0.19	0.15	0.00	0.00	0.36	0.36	0.30	0.04	0.15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.18	0.12	0.00	0.00	0.16	0.16	0.12	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.19	0.19	0.00	0.00	0.96	0.92	1.29	2.09	3.36	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.20	0.17	0.00	0.00	0.78	0.76	0.79	0.48	0.95	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
11	0.19	0.14	0.00	0.00	0.39	0.40	0.33	0.08	0.21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
12	0.18	0.12	0.00	0.00	0.17	0.18	0.14	0.01	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
13	0.19	0.17	0.00	0.00	0.88	0.85	1.04	4.11	2.91	0.03	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
14	0.19	0.16	0.00	0.00	0.75	0.73	0.74	0.75	1.15	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15	0.19	0.14	0.00	0.00	0.40	0.40	0.34	0.13	0.27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16	0.18	0.11	0.00	0.00	0.18	0.19	0.14	0.02	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
17	0.18	0.15	0.00	0.00	0.75	0.72	0.77	3.64	2.17	0.05	0.03	0.03	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18	0.18	0.15	0.00	0.00	0.70	0.68	0.67	0.98	1.25	0.03	0.02	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
19	0.18	0.13	0.00	0.00	0.39	0.39	0.34	0.19	0.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
20	0.18	0.11	0.00	0.00	0.19	0.19	0.15	0.03	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
21	0.18	0.15	0.00	0.00	0.73	0.70	0.73	2.15	1.96	0.08	0.05	0.04	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22	0.18	0.15	0.00	0.00	0.64	0.63	0.61	1.10	1.22	0.05	0.03	0.02	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
23	0.18	0.13	0.00	0.00	0.38	0.37	0.33	0.26	0.37	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24	0.17	0.11	0.00	0.00	0.18	0.19	0.15	0.05	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
25	0.17	0.14	0.00	0.00	0.60	0.58	0.59	1.89	1.52	0.17	0.10	0.09	0.10	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
26	0.17	0.14	0.00	0.00	0.58	0.57	0.56	1.20	1.16	0.08	0.05	0.04	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
27	0.17	0.13	0.00	0.00	0.36	0.36	0.32	0.33	0.40	0.02	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
28	0.16	0.11	0.00	0.00	0.19	0.19	0.15	0.08	0.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
29	0.16	0.13	0.00	0.00	0.48	0.47	0.47	1.37	1.04	0.30	0.17	0.16	0.17	0.00	0.03	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
30	0.16	0.13	0.00	0.00	0.53	0.52	0.51	1.21	1.05	0.12	0.07	0.06	0.07	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
31	0.16	0.12	0.00	0.00	0.34	0.34	0.30	0.35	0.40	0.03	0.02	0.02	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
32	0.16	0.10	0.00	0.00	0.18	0.19	0.16	0.10	0.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
33	0.16	0.13	0.00	0.00	0.47	0.46	0.45	1.04	0.89	0.16	0.09	0.08	0.09	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
34	0.16	0.11	0.00	0.00	0.31	0.31	0.28	0.35	0.38	0.04	0.02	0.02	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
35	0.15	0.10	0.01	0.00	0.18	0.18	0.15	0.12	0.14	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00
36	0.16	0.13	0.00	0.00	0.47	0.46	0.45	1.13	0.90	0.59	0.21	0.21	0.20	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
37	0.15	0.12	0.00	0.00	0.41	0.41	0.39	0.81	0.71	0.18	0.11	0.10	0.11	0.00	0.02	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
38	0.15	0.11	0.00	0.00	0.28	0.28	0.25	0.32	0.34	0.04	0.03	0.02	0.03	0.00	0.00	0.00	0.00	0.02	0.00	0.01	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
39	0.14	0.09	0.02	0.00	0.17	0.17	0.14	0.12	0.14	0.01	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.04	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00
40	0.15	0.12	0.00	0.00	0.43	0.43	0.42	1.03	0.83	1.26	0.82	0.80	0.76	0.00	0.17	0.00	0.00	0.00	0.00	0.01	0.00	0.01	0.00	0.00	0.61	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Table 1: Neap Tide Assessment Matrix

Outfall No.	Balbriggan SFW	Balbriggan BW	Rockabill SPA	Rockabill pNHA	Skerries SPA	Skerries NHA	Skerries BW	Loughshinny BW	Loughshinny pNHA	Rush BW	Rogerstown SPA	Rogerstown SAC	Rogerstown pNHA	Portrane BW	Portrane pNHA	Lambay SPA	Lambay SAC	Lambay pNHA	Donabate BW	Malahide SFW	Malahide SPA	Malahide SAC	Malahide BW	Malahide pNHA	Portmarnock BW	Baldoyle SPA	Baldoyle SAC	Baldoyle pNHA	Sutton BW	Ireland's Eye SPA	Ireland's Eye SAC	Ireland's Eye pNHA	Howth Head SPA	Howth Head SAC	Howth Head pNHA
41	0.15	0.12	0.00	0.00	0.42	0.42	0.40	0.96	0.79	0.52	0.33	0.33	0.32	0.00	0.07	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
42	0.15	0.11	0.00	0.00	0.37	0.37	0.35	0.69	0.62	0.17	0.10	0.10	0.10	0.00	0.02	0.00	0.00	0.01	0.00	0.02	0.00	0.00	0.00	0.00	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
43	0.14	0.10	0.01	0.00	0.25	0.25	0.22	0.29	0.30	0.04	0.03	0.02	0.03	0.00	0.00	0.02	0.00	0.03	0.00	0.02	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00
44	0.13	0.08	0.03	0.00	0.14	0.15	0.12	0.10	0.12	0.01	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.09	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.00	0.00	0.00	0.00
45	0.14	0.11	0.00	0.00	0.39	0.38	0.37	0.89	0.73	1.27	0.92	0.97	0.88	0.00	0.27	0.00	0.00	0.00	0.00	0.03	0.00	0.02	0.00	0.00	0.85	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
46	0.14	0.11	0.00	0.00	0.38	0.37	0.36	0.80	0.68	0.49	0.32	0.33	0.31	0.00	0.08	0.00	0.00	0.01	0.00	0.03	0.00	0.00	0.00	0.00	0.28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
47	0.14	0.11	0.01	0.00	0.33	0.32	0.30	0.56	0.51	0.15	0.10	0.10	0.09	0.00	0.02	0.01	0.00	0.02	0.00	0.03	0.00	0.00	0.00	0.00	0.08	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00
48	0.13	0.09	0.02	0.00	0.22	0.22	0.19	0.24	0.25	0.04	0.03	0.02	0.03	0.00	0.00	0.03	0.00	0.06	0.00	0.04	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00
49	0.12	0.07	0.05	0.01	0.13	0.13	0.11	0.09	0.11	0.01	0.00	0.00	0.00	0.00	0.00	0.07	0.00	0.14	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.09	0.00	0.00	0.00	0.00
50	0.13	0.11	0.00	0.00	0.36	0.35	0.34	0.79	0.65	1.28	0.97	1.04	0.93	0.00	0.34	0.00	0.00	0.01	0.00	0.05	0.00	0.04	0.00	0.00	0.95	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
51	0.13	0.10	0.00	0.00	0.34	0.34	0.32	0.69	0.59	0.47	0.32	0.33	0.30	0.00	0.09	0.00	0.00	0.02	0.00	0.05	0.00	0.00	0.00	0.00	0.29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
52	0.13	0.10	0.01	0.00	0.28	0.28	0.26	0.46	0.43	0.15	0.09	0.10	0.09	0.00	0.02	0.02	0.00	0.03	0.00	0.05	0.00	0.00	0.00	0.00	0.08	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00
53	0.12	0.08	0.03	0.00	0.19	0.19	0.16	0.21	0.21	0.04	0.02	0.02	0.02	0.00	0.00	0.05	0.00	0.09	0.00	0.05	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.05	0.00	0.00	0.00	0.00
54	0.11	0.07	0.06	0.01	0.11	0.11	0.10	0.09	0.10	0.01	0.00	0.00	0.00	0.00	0.00	0.10	0.00	0.19	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.12	0.00	0.00	0.00	0.00
55	0.13	0.10	0.00	0.00	0.34	0.33	0.32	0.73	0.61	1.25	1.00	1.08	0.95	0.00	0.40	0.00	0.00	0.01	0.00	0.07	0.00	0.05	0.00	0.00	1.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
56	0.13	0.10	0.01	0.00	0.31	0.31	0.29	0.61	0.53	0.46	0.31	0.33	0.30	0.00	0.10	0.01	0.00	0.02	0.00	0.08	0.00	0.01	0.00	0.00	0.30	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00
57	0.13	0.09	0.02	0.00	0.25	0.25	0.23	0.40	0.37	0.15	0.09	0.09	0.09	0.00	0.02	0.03	0.00	0.05	0.00	0.07	0.00	0.00	0.00	0.00	0.08	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00
58	0.11	0.07	0.04	0.01	0.16	0.16	0.14	0.19	0.19	0.04	0.03	0.03	0.02	0.00	0.00	0.06	0.00	0.12	0.00	0.07	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.07	0.00	0.00	0.00	0.00
59	0.10	0.06	0.07	0.01	0.11	0.11	0.09	0.09	0.09	0.02	0.00	0.00	0.00	0.00	0.00	0.12	0.00	0.22	0.00	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.14	0.00	0.00	0.00	0.00
60	0.07	0.02	0.01	0.00	0.07	0.07	0.06	0.13	0.11	0.24	0.25	0.28	0.24	1.71	0.50	0.04	1.03	0.04	1.19	0.15	0.90	0.67	2.60	0.88	0.29	1.38	0.03	1.54	1.32	0.23	0.04	0.24	0.04	0.24	0.03
61	0.06	0.02	0.02	0.00	0.06	0.06	0.06	0.12	0.10	0.20	0.21	0.23	0.20	0.92	0.37	0.04	0.64	0.05	0.72	0.16	0.56	0.47	1.15	0.55	0.25	0.68	0.03	0.81	0.85	0.30	0.04	0.31	0.05	0.31	0.04
62	0.05	0.02	0.02	0.00	0.06	0.05	0.05	0.11	0.09	0.18	0.18	0.20	0.17	0.47	0.29	0.04	0.41	0.05	0.45	0.16	0.35	0.33	0.60	0.35	0.21	0.34	0.03	0.41	0.46	0.31	0.05	0.28	0.05	0.28	0.04
63	0.04	0.02	0.02	0.00	0.05	0.05	0.05	0.10	0.09	0.16	0.16	0.17	0.15	0.26	0.22	0.05	0.28	0.05	0.30	0.17	0.24	0.24	0.36	0.24	0.18	0.18	0.03	0.22	0.25	0.27	0.05	0.18	0.04	0.18	0.03
64	0.04	0.02	0.02	0.00	0.06	0.06	0.05	0.10	0.09	0.15	0.14	0.16	0.13	0.18	0.19	0.06	0.22	0.07	0.23	0.18	0.18	0.19	0.26	0.18	0.16	0.13	0.02	0.16	0.18	0.22	0.07	0.13	0.03	0.13	0.02
65	0.05	0.03	0.03	0.01	0.07	0.07	0.06	0.11	0.09	0.14	0.13	0.15	0.13	0.14	0.17	0.08	0.19	0.09	0.20	0.20	0.16	0.17	0.21	0.16	0.15	0.11	0.01	0.13	0.14	0.15	0.09	0.09	0.02	0.09	0.02
66	0.05	0.03	0.04	0.02	0.05	0.05	0.05	0.08	0.07	0.09	0.08	0.09	0.08	0.08	0.10	0.10	0.11	0.10	0.12	0.19	0.09	0.10	0.13	0.09	0.09	0.06	0.01	0.07	0.08	0.08	0.11	0.05	0.01	0.05	0.01
67	0.04	0.02	0.04	0.02	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.05	0.11	0.05	0.10	0.05	0.13	0.04	0.05	0.06	0.04	0.04	0.02	0.00	0.03	0.04	0.04	0.11	0.03	0.00	0.03	0.00
68	0.06	0.02	0.01	0.00	0.05	0.05	0.05	0.10	0.08	0.17	0.18	0.20	0.17	3.03	0.34	0.04	0.71	0.04	0.83	0.13	0.61	0.45	2.10	0.60	0.21	2.76	0.04	2.84	2.39	0.26	0.04	0.28	0.05	0.28	0.04
69	0.04	0.01	0.02	0.00	0.05	0.05	0.04	0.09	0.07	0.14	0.14	0.16	0.13	1.46	0.24	0.05	0.42	0.05	0.48	0.14	0.36	0.30	0.91	0.36	0.16	1.18	0.04	1.31	1.38	0.34	0.05	0.38	0.06	0.38	0.05
70	0.03	0.01	0.02	0.00	0.04	0.04	0.03	0.07	0.06	0.11	0.11	0.12	0.10	0.66	0.17	0.04	0.26	0.05	0.29	0.14	0.22	0.20	0.43	0.22	0.13	0.50	0.05	0.58	0.69	0.39	0.05	0.42	0.07	0.42	0.06
71	0.03	0.01	0.02	0.00	0.04	0.04	0.03	0.06	0.06	0.10	0.10	0.11	0.09	0.30	0.14	0.05	0.18	0.05	0.20	0.14	0.15	0.15	0.25	0.15	0.11	0.21	0.05	0.26	0.33	0.39	0.05	0.32	0.07	0.32	0.06
72	0.04	0.02	0.03	0.01	0.04	0.04	0.04	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.06	0.09	0.06	0.08	0.07	0.13	0.05	0.06	0.07	0.05	0.05	0.03	0.00	0.04	0.05	0.05	0.09	0.03	0.01	0.03	0.00
73	0.03	0.01	0.02	0.00	0.04	0.04	0.03	0.07	0.06	0.11	0.11	0.12	0.10	2.40	0.18	0.05	0.30	0.05	0.34	0.13	0.25	0.21	0.73	0.25	0.12	2.19	0.05	2.25	2.32	0.33	0.05	0.36	0.08	0.36	0.06
74	0.03	0.01	0.02	0.00	0.03	0.03	0.03	0.06	0.05	0.09	0.09	0.10	0.08	1.12	0.13	0.05	0.19	0.05	0.22	0.14	0.16	0.15	0.37	0.16	0.10	0.95	0.06	1.03	1.17	0.38	0.05	0.46	0.09	0.46	0.07
75	0.02	0.01	0.01	0.00	0.03	0.03	0.03	0.05	0.04	0.08	0.07	0.08	0.07	0.55	0.11	0.04	0.14	0.04	0.16	0.13	0.12	0.12	0.23	0.12	0.09	0.42	0.08	0.49	0.62	0.41	0.04	0.54	0.11	0.54	0.09
76	0.03	0.02	0.03	0.01	0.04	0.04	0.04	0.06	0.05	0.07	0.06	0.07	0.06	0.06	0.07	0.07	0.08	0.07	0.08	0.12	0.06	0.07	0.09	0.07	0.07	0.04	0.01	0.05	0.06	0.06	0.07	0.04	0.02	0.04	0.01
77	0.03	0.01	0.02	0.00	0.03	0.03	0.03	0.06	0.05	0.09	0.09	0.10	0.09	3.61	0.15	0.04	0.24	0.05	0.27	0.13	0.20	0.17	0.59	0.20	0.11	3.69	0.07	3.57	3.68	0.31	0.05	0.33	0.10	0.33	0.07
78	0.02	0.00	0.01	0.00	0.03	0.03	0.03	0.05	0.04	0.08	0.07	0.08	0.07	1.77	0.11	0.04	0.16	0.04	0.18	0.13	0.13	0.12	0.33	0.13	0.08	1.49	0.09	1.63	1.81	0.33	0.04	0.36	0.12	0.36	0.09
79	0.02	0.00	0.01	0.00	0.03	0.03	0.02	0.05	0.04	0.07	0.07	0.07	0.06	0.92	0.09	0.04	0.13	0.04	0.14	0.12	0.10	0.10	0.22	0.10	0.07	0.71	0.10	0.83	0.99	0.35	0.04	0.39	0.13	0.39	0.11
80	0.03	0.02	0.02	0.00	0.04	0.04	0.04	0.06	0.06	0.07	0.07	0.07	0.07	0.07	0.08	0.06	0.09	0.06	0.09	0.12	0.07	0.08	0.10	0.08	0.08	0.05	0.02	0.06	0.07	0.08	0.06	0.06	0.03	0.06	0.02

Table 2 (cont'd): Neap Tide Assessment Matrix

Outfall No.	Balbriggan SPW	Balbriggan BW	Rockabill SPA	Rockabill pNHA	Skerries SPA	Skerries NHA	Skerries BW	Loughshinny BW	Loughshinny pNHA	Rush BW	Rogerstown SPA	Rogerstown SAC	Rogerstown pNHA	Portrane BW	Portrane pNHA	Lambay SPA	Lambay SAC	Lambay pNHA	Donabate BW	Malahide SPW	Malahide SPA	Malahide SAC	Malahide BW	Malahide pNHA	Portmarnock BW	Baldoyle SPA	Baldoyle SAC	Baldoyle pNHA	Sutton BW	Ireland's Eye SPA	Ireland's Eye SAC	Ireland's Eye pNHA	Howth Head SPA	Howth Head SAC	Howth Head pNHA
1	0.09	0.11	0.00	0.00	0.37	0.37	0.70	0.26	0.49	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.08	0.10	0.00	0.00	0.24	0.24	0.25	0.05	0.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.07	0.09	0.00	0.00	0.11	0.11	0.09	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.06	0.08	0.00	0.00	0.06	0.06	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.09	0.11	0.00	0.00	0.38	0.37	0.87	0.51	1.78	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.09	0.10	0.00	0.00	0.27	0.26	0.31	0.09	0.18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	0.07	0.09	0.00	0.00	0.12	0.13	0.10	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.06	0.08	0.00	0.00	0.06	0.06	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.09	0.11	0.00	0.00	0.38	0.37	0.85	0.90	1.55	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.09	0.10	0.00	0.00	0.28	0.28	0.35	0.14	0.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
11	0.08	0.09	0.00	0.00	0.13	0.14	0.11	0.02	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
12	0.07	0.07	0.00	0.00	0.06	0.06	0.05	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
13	0.09	0.10	0.00	0.00	0.36	0.35	0.77	2.01	1.24	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
14	0.09	0.10	0.00	0.00	0.29	0.28	0.38	0.21	0.34	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15	0.08	0.09	0.00	0.00	0.15	0.15	0.13	0.03	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16	0.07	0.07	0.00	0.00	0.07	0.07	0.05	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
17	0.09	0.10	0.00	0.00	0.33	0.32	0.60	1.96	0.91	0.03	0.02	0.02	0.02	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18	0.09	0.10	0.00	0.00	0.29	0.29	0.40	0.31	0.41	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
19	0.08	0.08	0.00	0.00	0.16	0.16	0.15	0.06	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
20	0.07	0.07	0.00	0.00	0.08	0.08	0.06	0.02	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
21	0.09	0.10	0.00	0.00	0.33	0.32	0.55	0.89	0.77	0.05	0.04	0.03	0.04	0.02	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22	0.09	0.10	0.00	0.00	0.29	0.29	0.38	0.36	0.44	0.03	0.02	0.02	0.02	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
23	0.08	0.08	0.00	0.00	0.17	0.17	0.16	0.09	0.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24	0.07	0.07	0.00	0.00	0.09	0.09	0.07	0.04	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
25	0.09	0.10	0.00	0.00	0.30	0.29	0.45	0.75	0.67	0.11	0.08	0.07	0.09	0.05	0.02	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
26	0.09	0.10	0.00	0.00	0.29	0.28	0.37	0.42	0.47	0.04	0.04	0.03	0.04	0.02	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
27	0.08	0.08	0.00	0.00	0.17	0.17	0.16	0.12	0.14	0.02	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
28	0.08	0.07	0.00	0.00	0.09	0.09	0.08	0.06	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
29	0.09	0.10	0.00	0.00	0.27	0.27	0.35	0.64	0.55	0.17	0.12	0.10	0.13	0.08	0.04	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
30	0.09	0.10	0.00	0.00	0.28	0.27	0.35	0.45	0.47	0.06	0.05	0.04	0.05	0.03	0.01	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
31	0.08	0.08	0.00	0.00	0.16	0.16	0.16	0.13	0.15	0.02	0.02	0.02	0.02	0.01	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
32	0.08	0.07	0.00	0.00	0.09	0.09	0.09	0.06	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
33	0.09	0.09	0.00	0.00	0.26	0.26	0.31	0.40	0.41	0.08	0.06	0.05	0.07	0.04	0.02	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
34	0.08	0.08	0.00	0.00	0.16	0.16	0.15	0.13	0.14	0.03	0.02	0.02	0.02	0.01	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
35	0.08	0.07	0.00	0.00	0.09	0.09	0.09	0.07	0.07	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
36	0.09	0.10	0.00	0.00	0.27	0.27	0.33	0.49	0.47	0.35	0.13	0.11	0.12	0.07	0.03	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
37	0.09	0.09	0.00	0.00	0.24	0.23	0.26	0.31	0.33	0.09	0.07	0.06	0.07	0.04	0.02	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
38	0.08	0.08	0.00	0.00	0.15	0.15	0.14	0.12	0.13	0.03	0.02	0.02	0.02	0.01	0.00	0.00	0.00	0.01	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
39	0.07	0.07	0.01	0.01	0.09	0.09	0.08	0.06	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.02	0.03	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
40	0.09	0.10	0.00	0.00	0.28	0.27	0.33	0.48	0.46	0.59	0.36	0.33	0.33	0.22	0.10	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Table 3: Spring Tide Assessment Matrix

Outfall No.	Balbriggan SPW	Balbriggan BW	Rockabill SPA	Rockabill pNHA	Skerries SPA	Skerries NHA	Skerries BW	Loughshinny BW	Loughshinny pNHA	Rush BW	Rogerstown SPA	Rogerstown SAC	Rogerstown pNHA	Portrane BW	Portrane pNHA	Lambay SPA	Lambay SAC	Lambay pNHA	Donabate BW	Malahide SPW	Malahide SPA	Malahide SAC	Malahide BW	Malahide pNHA	Portmarnock BW	Baldoyle SPA	Baldoyle SAC	Baldoyle pNHA	Sutton BW	Ireland's Eye SPA	Ireland's Eye SAC	Ireland's Eye pNHA	Howth Head SPA	Howth Head SAC	Howth Head pNHA
41	0.09	0.10	0.00	0.00	0.26	0.26	0.30	0.43	0.41	0.21	0.16	0.14	0.16	0.11	0.05	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
42	0.09	0.09	0.00	0.00	0.22	0.22	0.24	0.26	0.28	0.07	0.06	0.05	0.06	0.04	0.02	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
43	0.08	0.08	0.00	0.00	0.14	0.14	0.13	0.11	0.12	0.02	0.02	0.01	0.02	0.01	0.00	0.01	0.02	0.02	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
44	0.07	0.07	0.02	0.01	0.08	0.08	0.08	0.05	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.03	0.04	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
45	0.09	0.10	0.00	0.00	0.28	0.27	0.32	0.49	0.45	0.55	0.41	0.39	0.40	0.30	0.13	0.00	0.00	0.00	0.01	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
46	0.09	0.10	0.00	0.00	0.25	0.25	0.29	0.41	0.39	0.19	0.14	0.13	0.15	0.10	0.04	0.00	0.00	0.00	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
47	0.09	0.09	0.00	0.00	0.20	0.20	0.21	0.23	0.25	0.06	0.05	0.04	0.05	0.03	0.01	0.01	0.01	0.02	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
48	0.08	0.08	0.01	0.01	0.12	0.12	0.12	0.09	0.11	0.02	0.01	0.01	0.01	0.00	0.00	0.02	0.03	0.04	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
49	0.07	0.07	0.02	0.01	0.08	0.08	0.07	0.05	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.04	0.05	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
50	0.09	0.10	0.00	0.00	0.27	0.26	0.31	0.49	0.44	0.54	0.42	0.41	0.43	0.33	0.13	0.00	0.00	0.00	0.02	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
51	0.09	0.09	0.00	0.00	0.23	0.23	0.27	0.39	0.35	0.17	0.13	0.11	0.13	0.09	0.04	0.00	0.00	0.01	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
52	0.08	0.09	0.00	0.00	0.18	0.18	0.19	0.20	0.21	0.05	0.04	0.03	0.04	0.02	0.00	0.02	0.02	0.03	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
53	0.08	0.07	0.02	0.01	0.11	0.11	0.11	0.08	0.09	0.01	0.01	0.00	0.01	0.00	0.00	0.04	0.04	0.05	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
54	0.07	0.07	0.03	0.02	0.08	0.08	0.07	0.05	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.05	0.06	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
55	0.09	0.10	0.00	0.00	0.26	0.25	0.30	0.47	0.40	0.52	0.42	0.40	0.43	0.33	0.13	0.00	0.00	0.00	0.03	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
56	0.09	0.09	0.00	0.00	0.22	0.21	0.24	0.35	0.31	0.14	0.11	0.09	0.11	0.07	0.03	0.01	0.01	0.02	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
57	0.08	0.08	0.01	0.00	0.16	0.16	0.17	0.17	0.17	0.04	0.03	0.03	0.03	0.02	0.00	0.03	0.03	0.04	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
58	0.08	0.07	0.02	0.01	0.10	0.10	0.10	0.07	0.08	0.01	0.01	0.00	0.01	0.00	0.00	0.05	0.05	0.06	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
59	0.07	0.07	0.03	0.02	0.08	0.08	0.07	0.05	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.05	0.06	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
60	0.10	0.08	0.02	0.02	0.17	0.17	0.19	0.24	0.23	0.29	0.34	0.32	0.35	0.32	0.35	0.04	0.04	0.05	0.39	0.07	0.62	0.52	0.61	0.59	0.83	1.12	0.88	0.98	0.73	0.11	0.12	0.12	0.06	0.05	0.05
61	0.09	0.07	0.02	0.02	0.14	0.14	0.17	0.19	0.19	0.23	0.26	0.25	0.27	0.25	0.27	0.04	0.04	0.05	0.29	0.06	0.41	0.36	0.40	0.40	0.47	0.56	0.41	0.48	0.34	0.11	0.11	0.11	0.05	0.04	0.04
62	0.07	0.07	0.02	0.02	0.12	0.12	0.14	0.16	0.16	0.18	0.20	0.19	0.21	0.19	0.20	0.04	0.04	0.05	0.21	0.06	0.27	0.23	0.24	0.26	0.27	0.30	0.21	0.25	0.18	0.11	0.08	0.08	0.03	0.03	0.03
63	0.07	0.06	0.02	0.02	0.11	0.11	0.13	0.14	0.13	0.15	0.16	0.15	0.17	0.15	0.15	0.04	0.04	0.05	0.15	0.05	0.18	0.16	0.16	0.18	0.16	0.16	0.12	0.14	0.10	0.10	0.05	0.05	0.03	0.02	0.02
64	0.07	0.06	0.02	0.02	0.11	0.11	0.12	0.13	0.13	0.13	0.14	0.13	0.15	0.13	0.12	0.05	0.05	0.06	0.12	0.06	0.14	0.12	0.12	0.14	0.12	0.13	0.09	0.11	0.08	0.08	0.04	0.04	0.02	0.02	0.02
65	0.07	0.07	0.03	0.02	0.11	0.11	0.13	0.13	0.13	0.13	0.14	0.13	0.14	0.13	0.12	0.06	0.06	0.07	0.11	0.07	0.12	0.11	0.11	0.12	0.11	0.11	0.08	0.09	0.07	0.05	0.04	0.04	0.02	0.02	0.02
66	0.07	0.06	0.03	0.02	0.10	0.09	0.10	0.10	0.10	0.08	0.08	0.08	0.09	0.08	0.07	0.07	0.08	0.08	0.06	0.07	0.07	0.06	0.06	0.07	0.05	0.06	0.04	0.05	0.04	0.02	0.02	0.02	0.01	0.00	0.00
67	0.06	0.05	0.03	0.03	0.07	0.07	0.07	0.06	0.07	0.04	0.04	0.04	0.04	0.04	0.03	0.08	0.08	0.09	0.03	0.05	0.03	0.03	0.03	0.03	0.02	0.03	0.02	0.02	0.02	0.00	0.00	0.00	0.00	0.00	0.00
68	0.09	0.07	0.02	0.02	0.15	0.14	0.17	0.20	0.19	0.24	0.26	0.25	0.28	0.25	0.26	0.05	0.05	0.06	0.28	0.07	0.44	0.37	0.43	0.42	0.69	2.38	1.68	1.94	1.46	0.12	0.12	0.12	0.07	0.06	0.06
69	0.07	0.07	0.02	0.02	0.12	0.12	0.14	0.16	0.15	0.17	0.19	0.18	0.20	0.18	0.18	0.04	0.04	0.05	0.20	0.06	0.28	0.24	0.27	0.27	0.38	1.04	0.77	0.87	0.68	0.12	0.13	0.13	0.06	0.06	0.06
70	0.06	0.06	0.02	0.02	0.10	0.10	0.11	0.12	0.12	0.13	0.14	0.13	0.15	0.13	0.13	0.03	0.04	0.04	0.13	0.04	0.18	0.15	0.16	0.17	0.20	0.46	0.34	0.39	0.30	0.14	0.12	0.12	0.05	0.04	0.04
71	0.05	0.05	0.02	0.01	0.08	0.08	0.10	0.10	0.10	0.10	0.11	0.10	0.12	0.10	0.09	0.04	0.04	0.04	0.10	0.04	0.12	0.10	0.10	0.12	0.12	0.20	0.14	0.17	0.13	0.17	0.11	0.11	0.04	0.03	0.03
72	0.06	0.05	0.03	0.02	0.07	0.07	0.07	0.07	0.07	0.05	0.05	0.05	0.06	0.05	0.04	0.07	0.07	0.07	0.04	0.05	0.04	0.04	0.04	0.04	0.03	0.03	0.02	0.03	0.02	0.01	0.00	0.00	0.00	0.00	0.00
73	0.07	0.06	0.02	0.02	0.11	0.11	0.12	0.14	0.14	0.15	0.16	0.15	0.17	0.15	0.15	0.04	0.04	0.05	0.15	0.05	0.22	0.18	0.20	0.21	0.32	2.28	1.36	1.72	1.13	0.10	0.11	0.11	0.07	0.06	0.07
74	0.06	0.06	0.02	0.02	0.09	0.09	0.11	0.11	0.11	0.11	0.12	0.11	0.12	0.11	0.10	0.04	0.04	0.04	0.10	0.04	0.14	0.11	0.12	0.13	0.17	1.03	0.68	0.81	0.62	0.12	0.16	0.16	0.06	0.06	0.06
75	0.05	0.05	0.02	0.01	0.08	0.08	0.09	0.09	0.09	0.09	0.09	0.09	0.10	0.08	0.08	0.03	0.03	0.04	0.08	0.04	0.10	0.08	0.08	0.10	0.10	0.45	0.32	0.37	0.30	0.15	0.23	0.23	0.05	0.05	0.05
76	0.05	0.05	0.02	0.02	0.07	0.07	0.07	0.07	0.07	0.06	0.07	0.06	0.07	0.06	0.05	0.05	0.06	0.06	0.05	0.06	0.05	0.05	0.05	0.05	0.04	0.04	0.03	0.03	0.03	0.02	0.01	0.01	0.00	0.00	0.00
77	0.06	0.06	0.02	0.02	0.10	0.10	0.12	0.13	0.13	0.13	0.15	0.14	0.15	0.14	0.13	0.04	0.04	0.05	0.14	0.05	0.20	0.17	0.19	0.19	0.30	3.53	1.92	2.59	1.48	0.09	0.09	0.09	0.08	0.07	0.07
78	0.05	0.05	0.02	0.01	0.09	0.09	0.10	0.10	0.10	0.10	0.11	0.10	0.11	0.10	0.09	0.03	0.03	0.04	0.09	0.04	0.12	0.10	0.11	0.12	0.16	1.56	0.98	1.21	0.82	0.09	0.10	0.10	0.07	0.06	0.07
79	0.05	0.05	0.02	0.01	0.08	0.08	0.09	0.09	0.09	0.08	0.09	0.08	0.09	0.08	0.07	0.03	0.03	0.04	0.07	0.03	0.09	0.08	0.08	0.09	0.10	0.76	0.52	0.61	0.47	0.11	0.12	0.12	0.06	0.06	0.06
80	0.05	0.04	0.02	0.01	0.07	0.07	0.07	0.08	0.08	0.07	0.07	0.07	0.08	0.07	0.06	0.05	0.05	0.05	0.06	0.05	0.07	0.06	0.06	0.07	0.05	0.05	0.04	0.04	0.04	0.03	0.02	0.02	0.02	0.01	0.01

Table 4 (cont'd): Spring Tide Assessment Matrix

Appendix II: Hydrodynamic Results

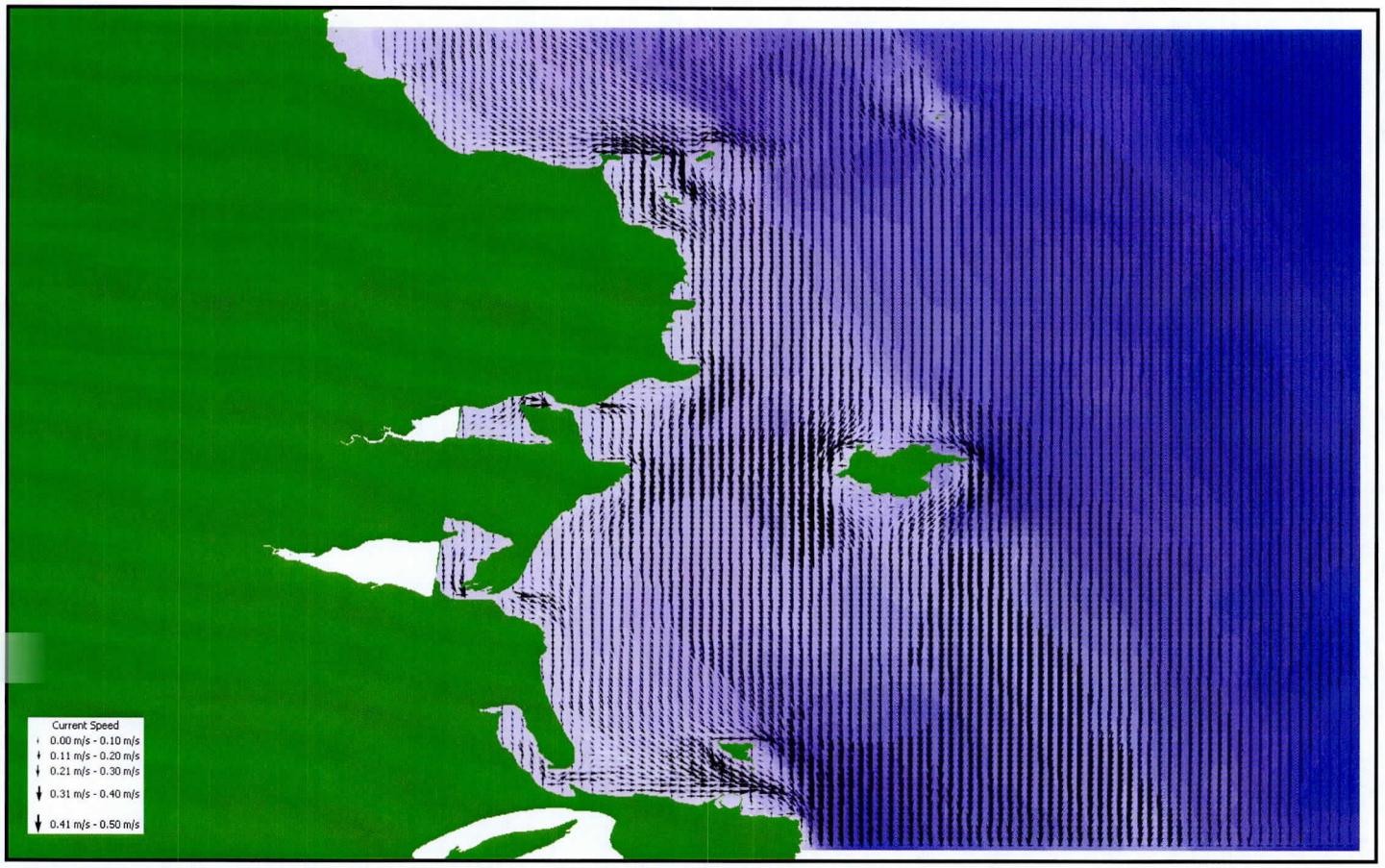


Figure 16: Mid Ebb Neap Tide

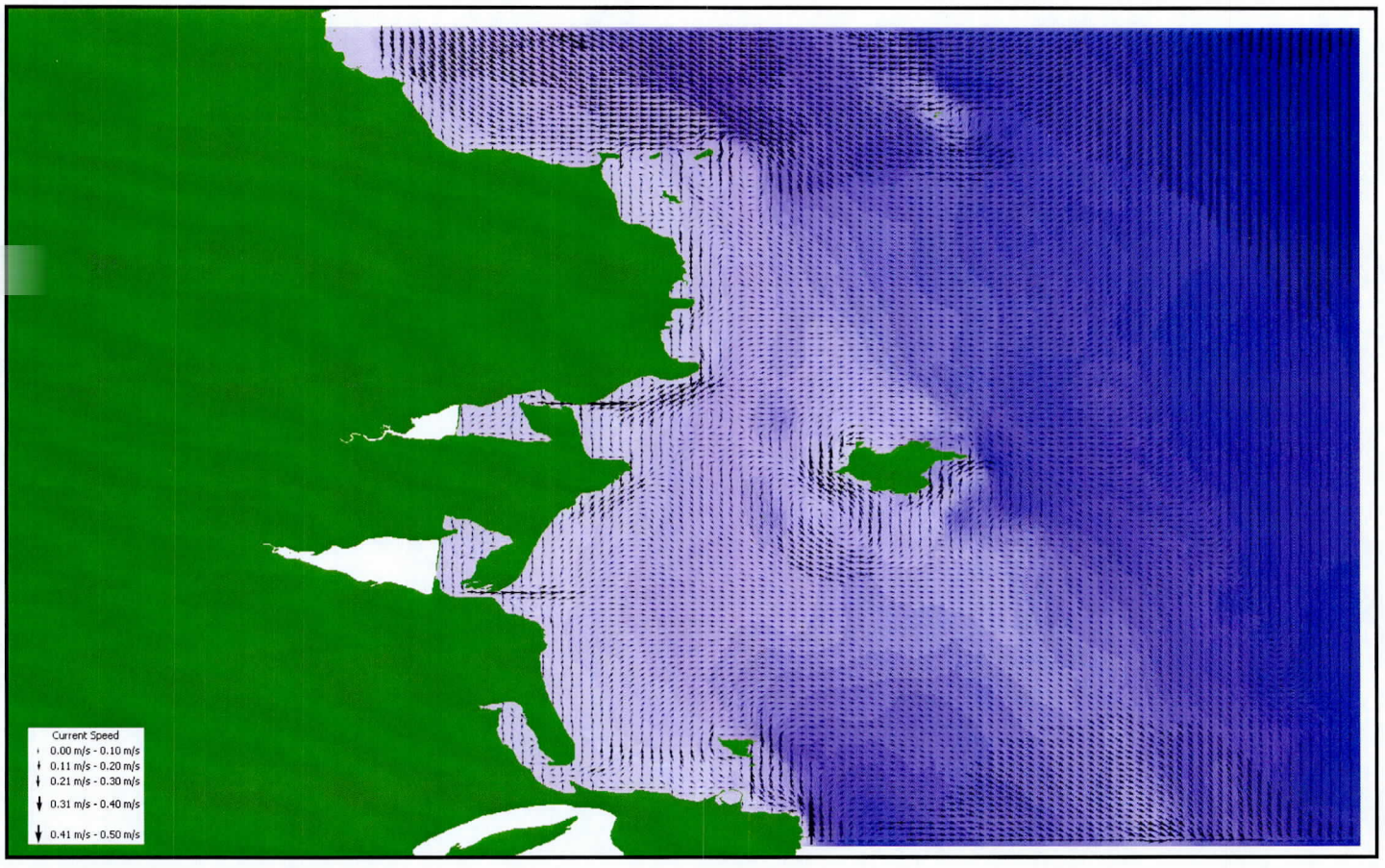


Figure 17: Low Water Neap Tide

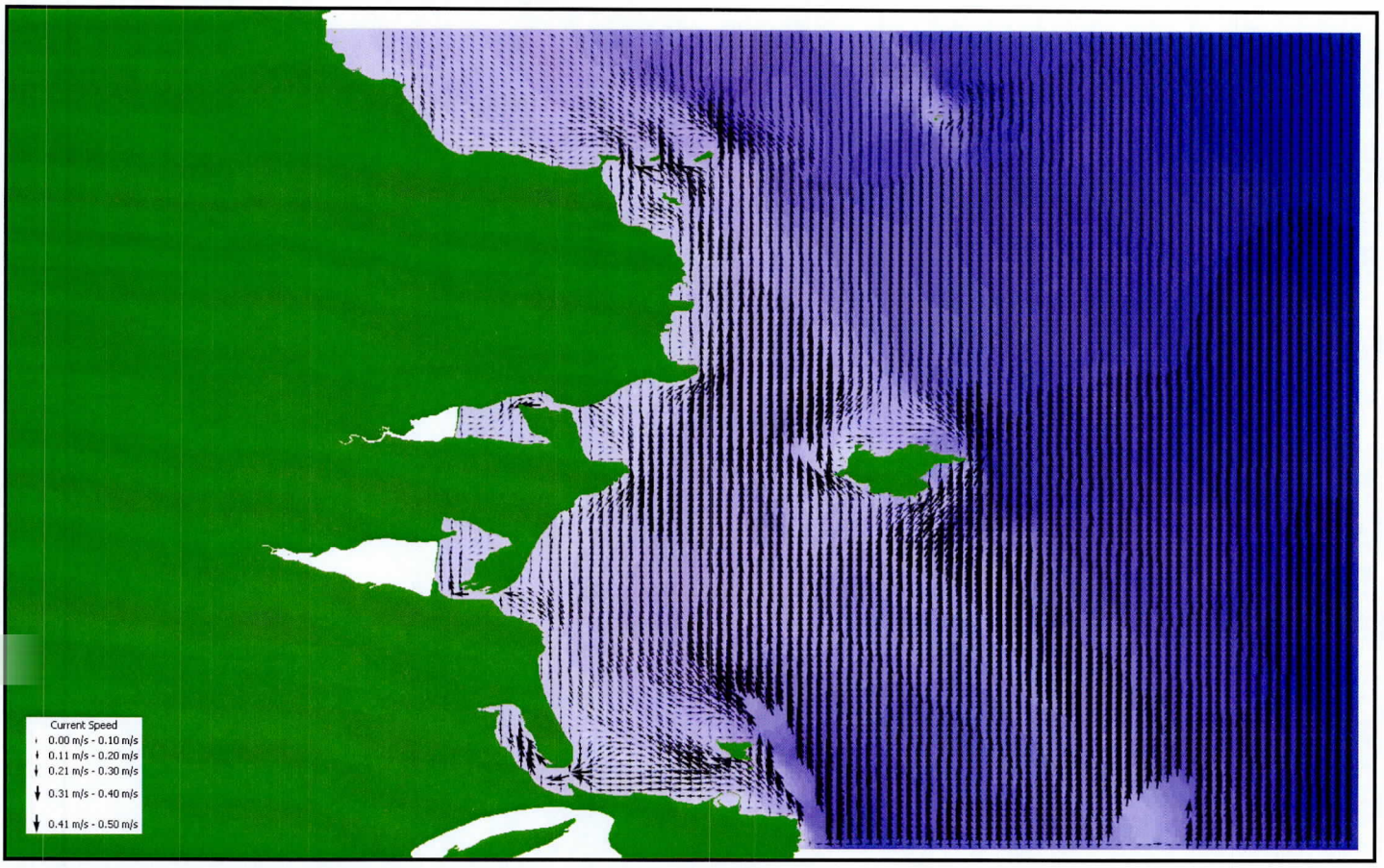


Figure 18: Mid Flood Neap Tide

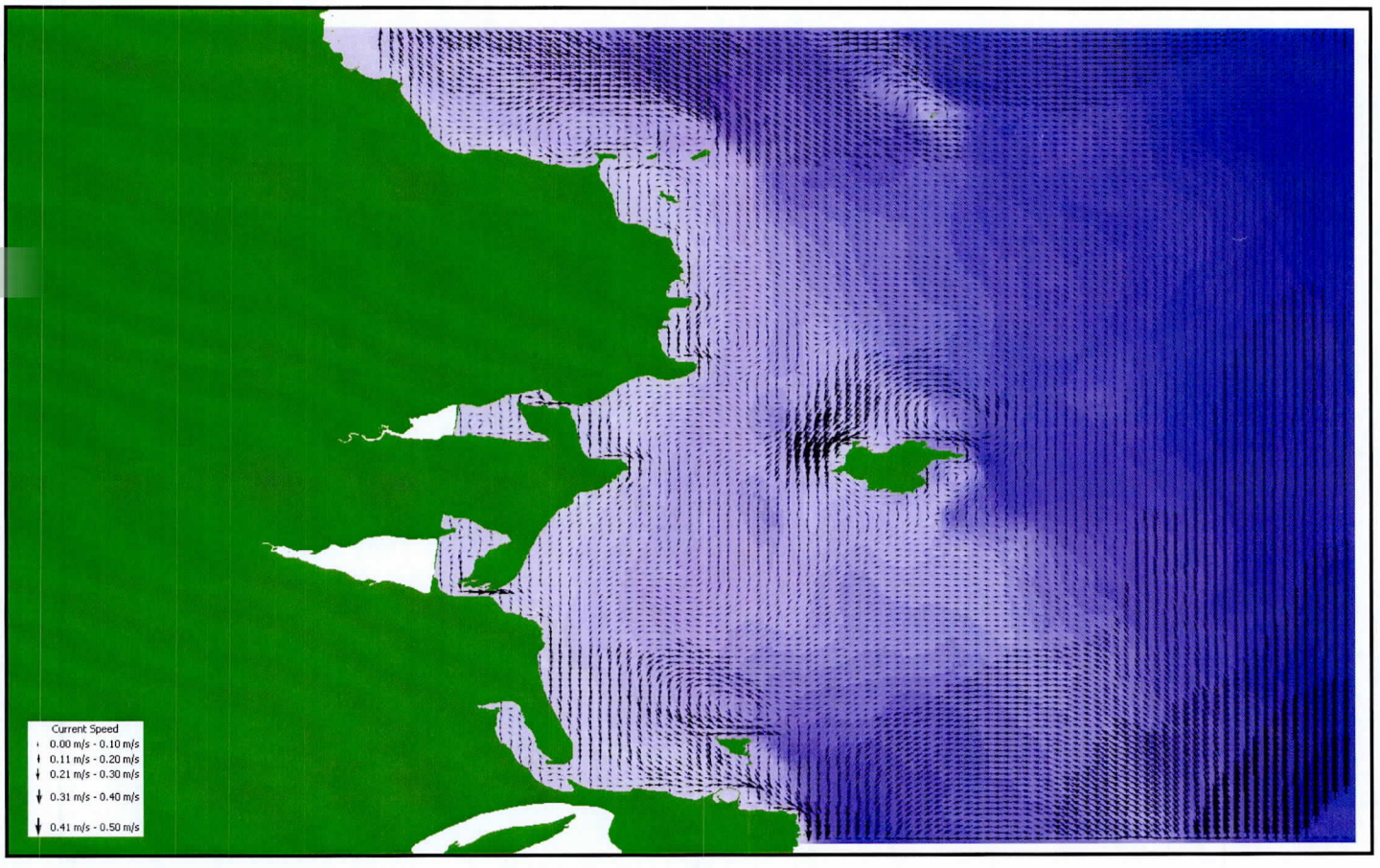


Figure 19: High Water Neap Tide

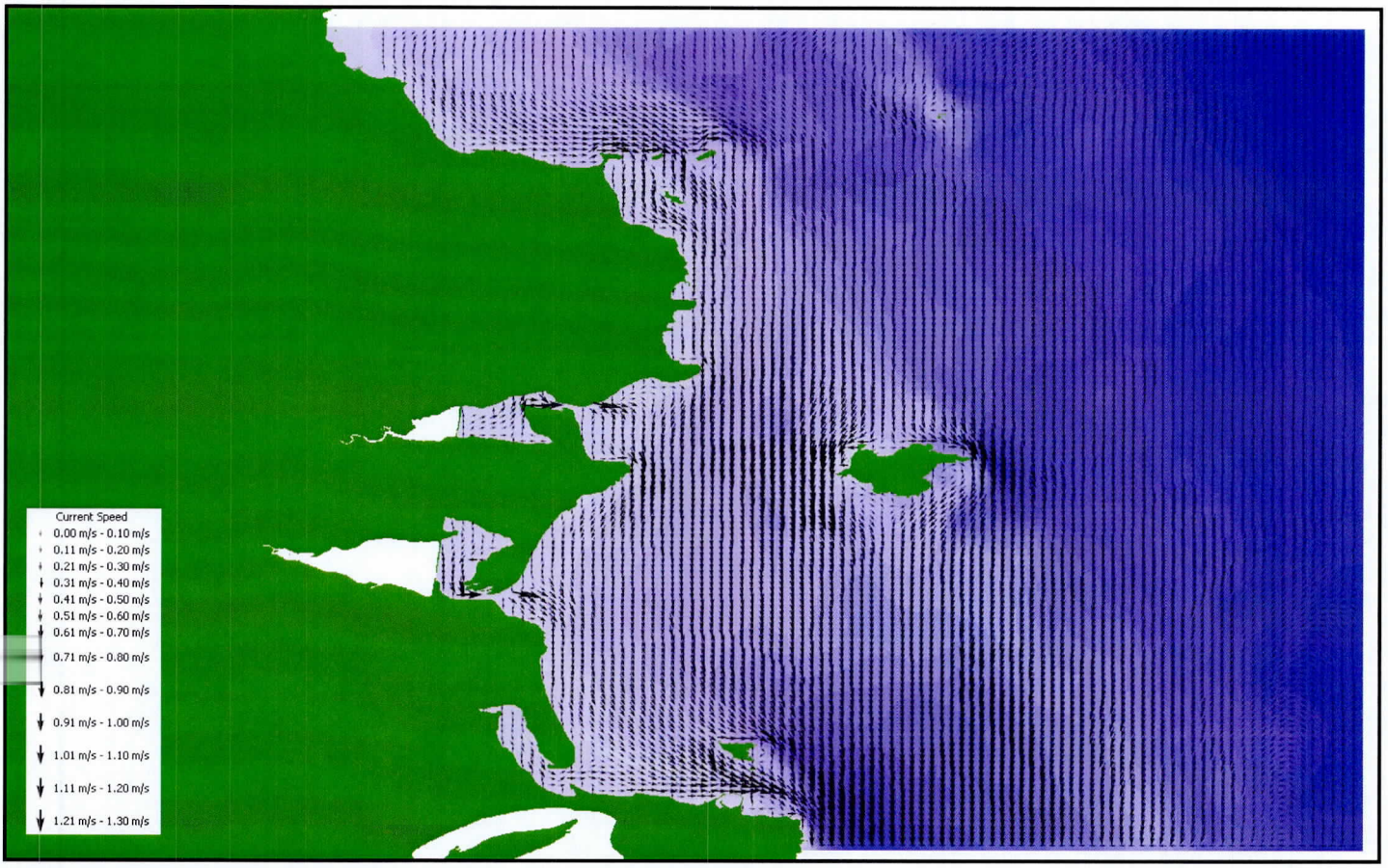


Figure 20: Mid Ebb Spring Tide

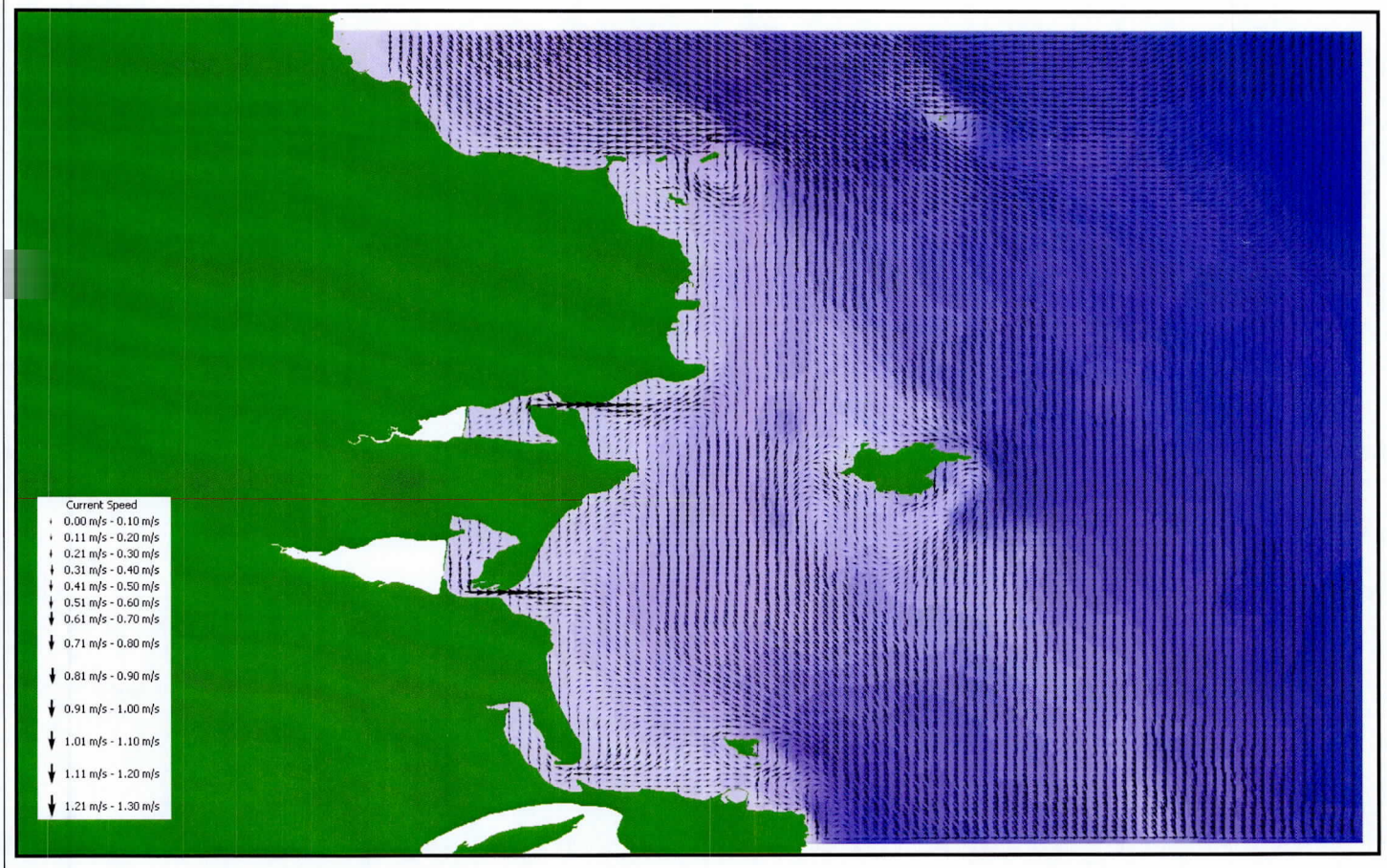


Figure 21: Low Water Spring Tide

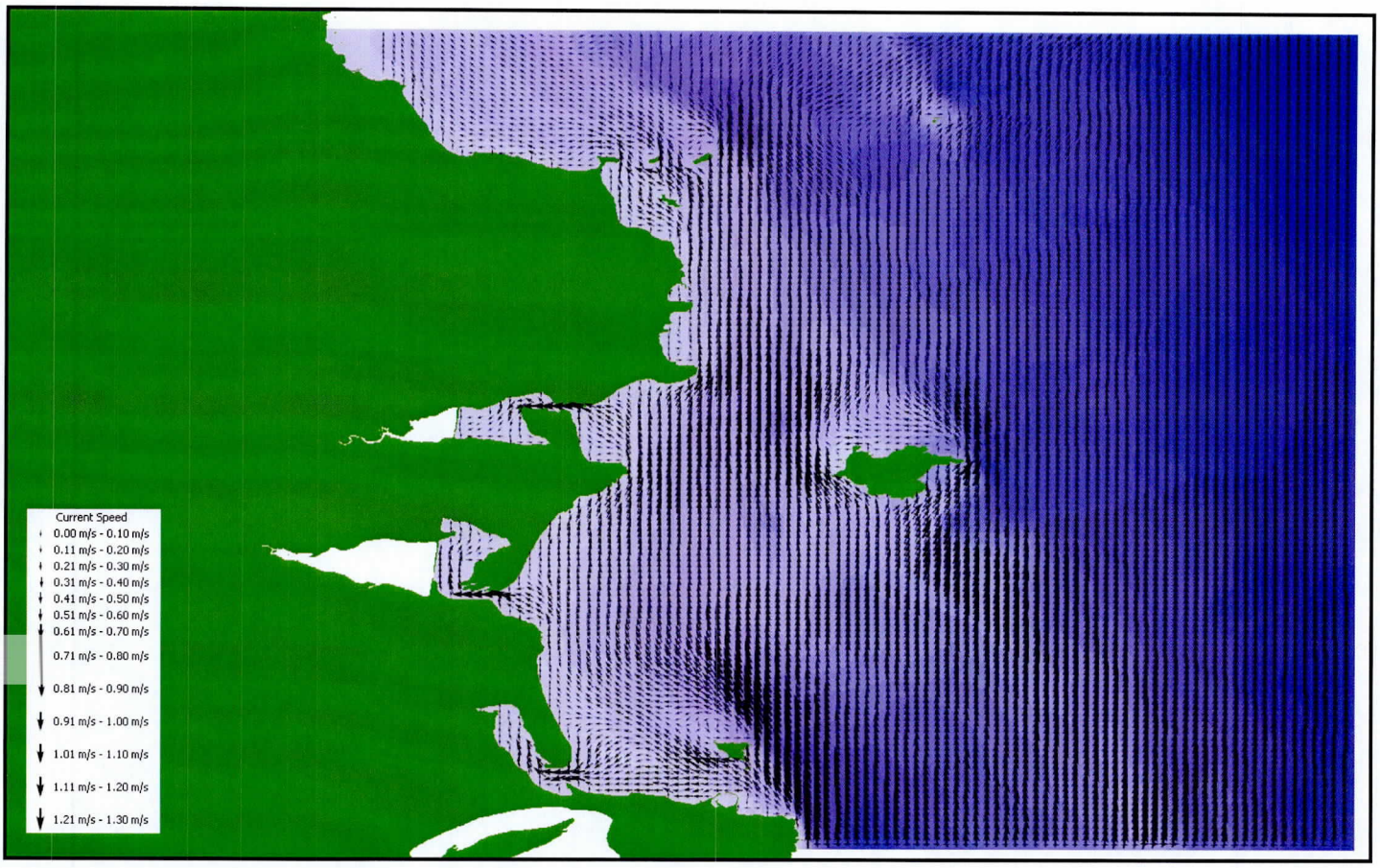


Figure 22: Mid Flood Spring Tide

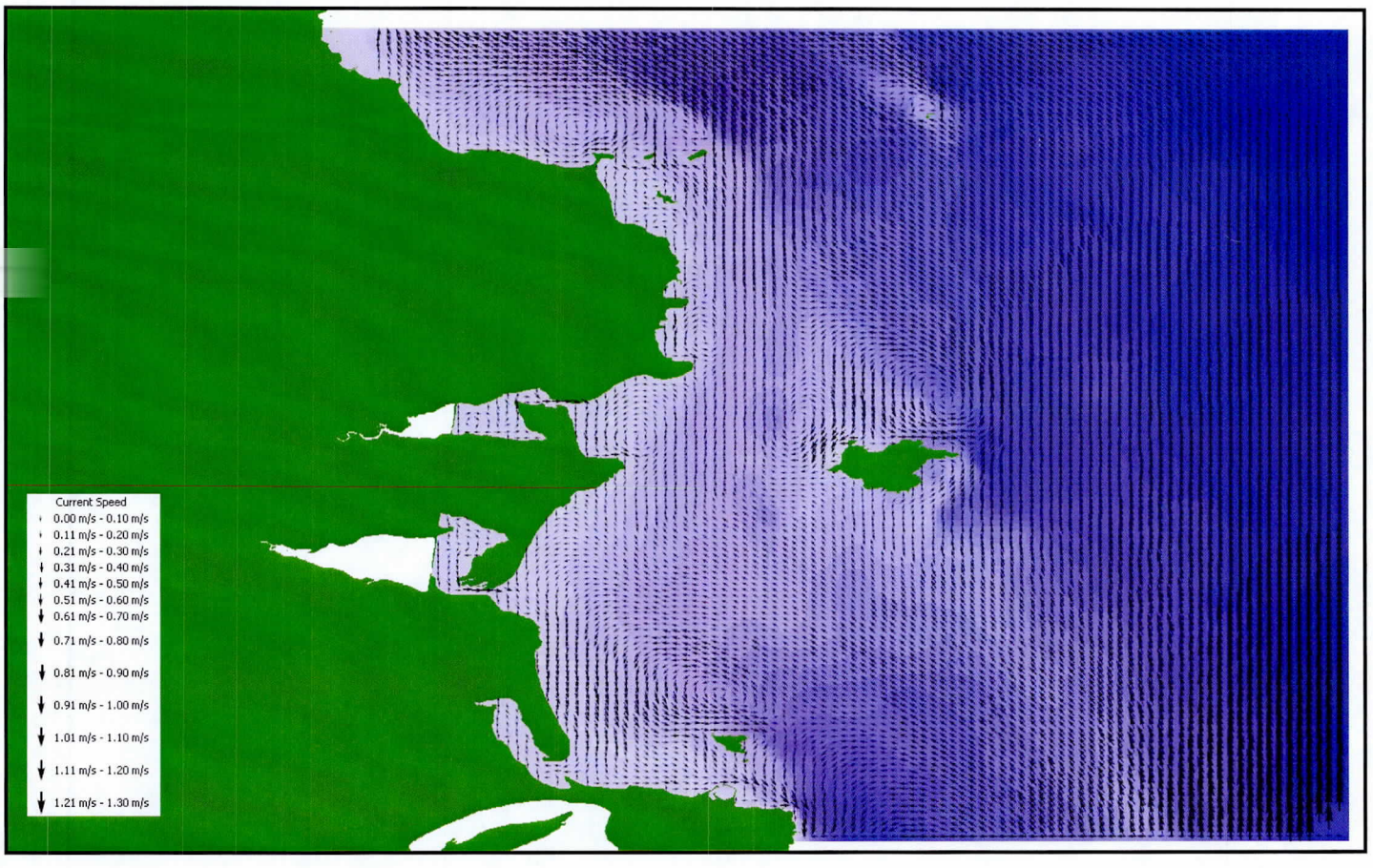


Figure 23: High Water Spring Tide

Appendix III: Solute Transport Results.

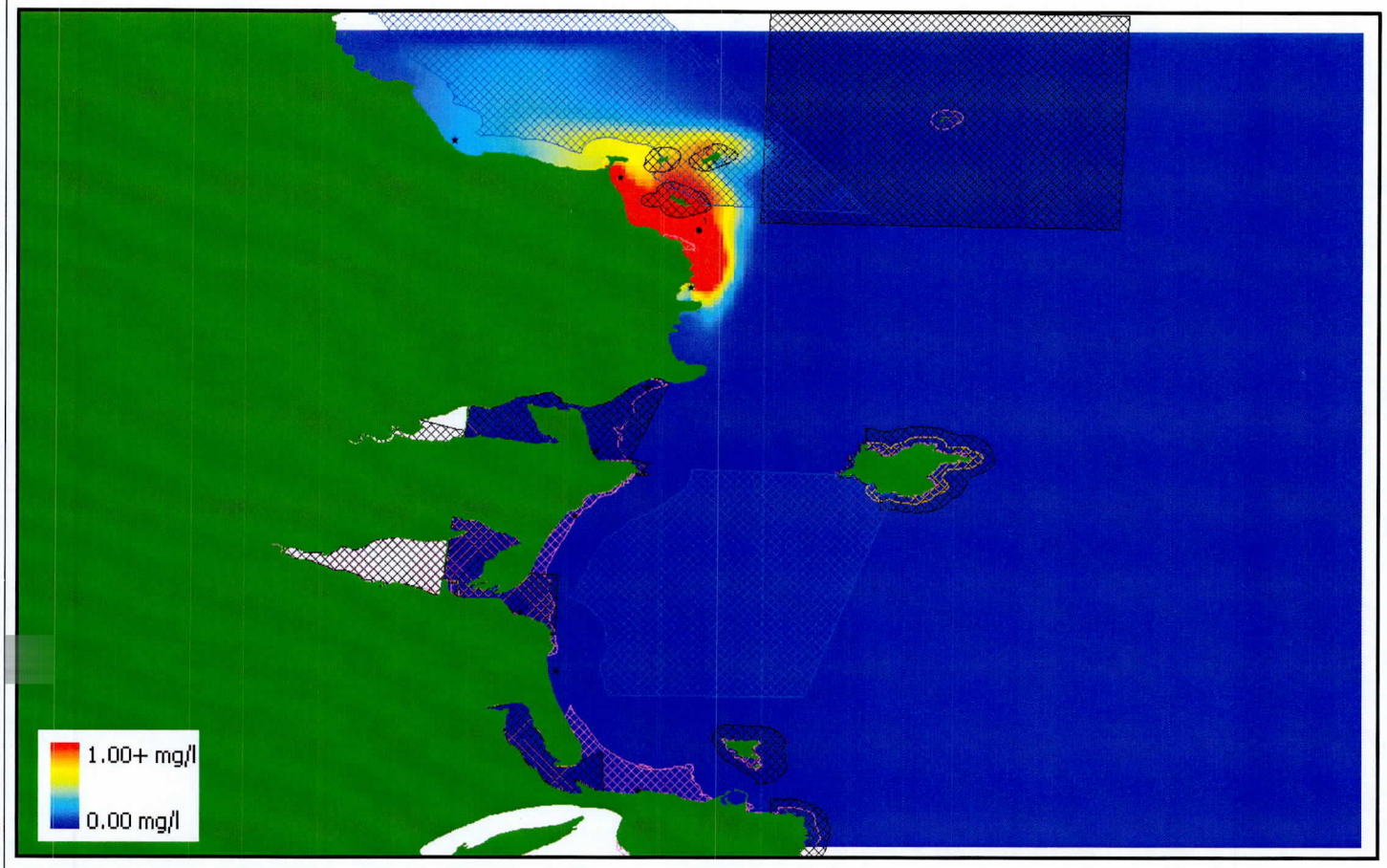


Figure 24: Outfall No. 1 solute plume at mid ebb on a neap tide

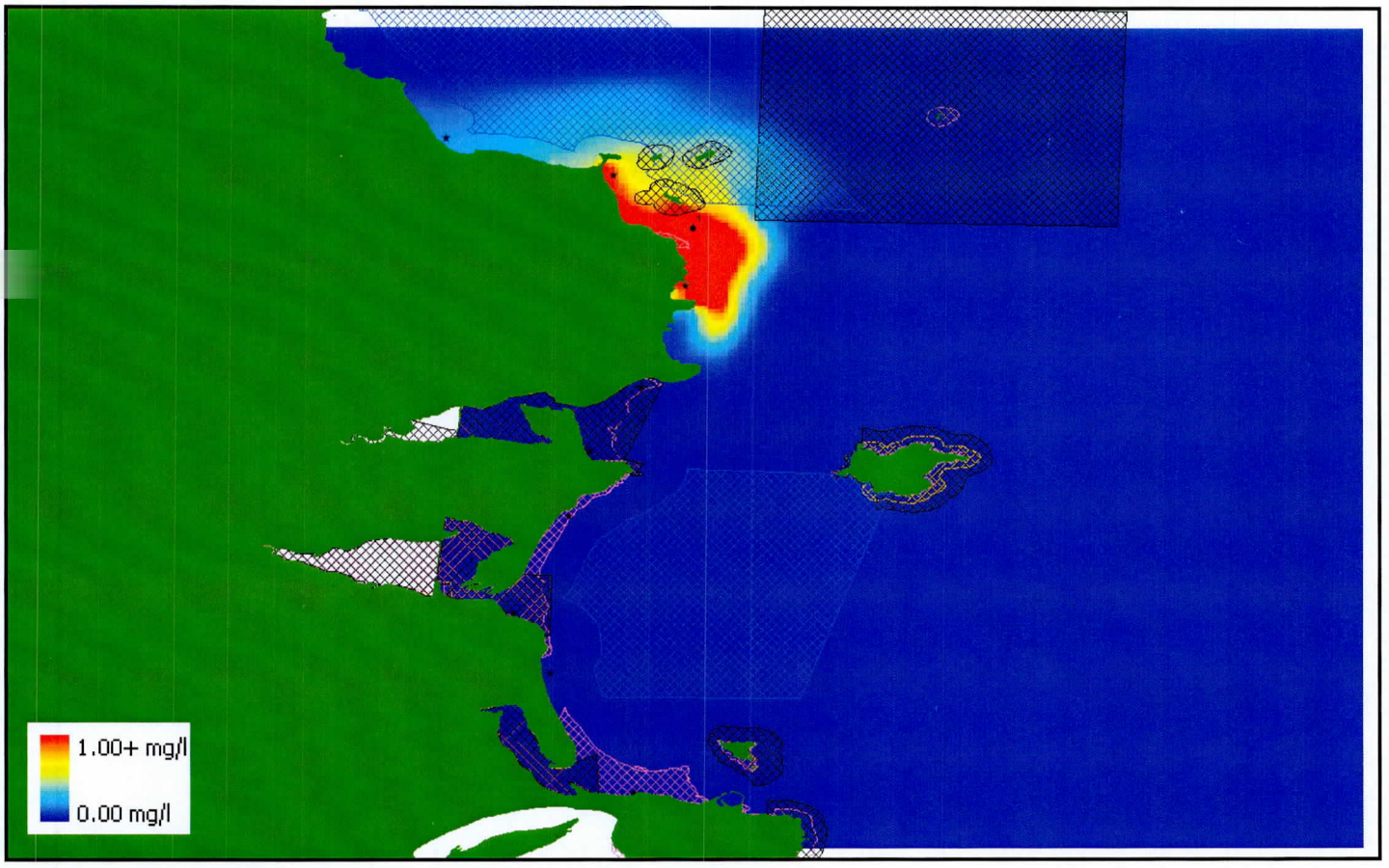


Figure 25: Outfall No. 1 solute plume at low water on a neap tide

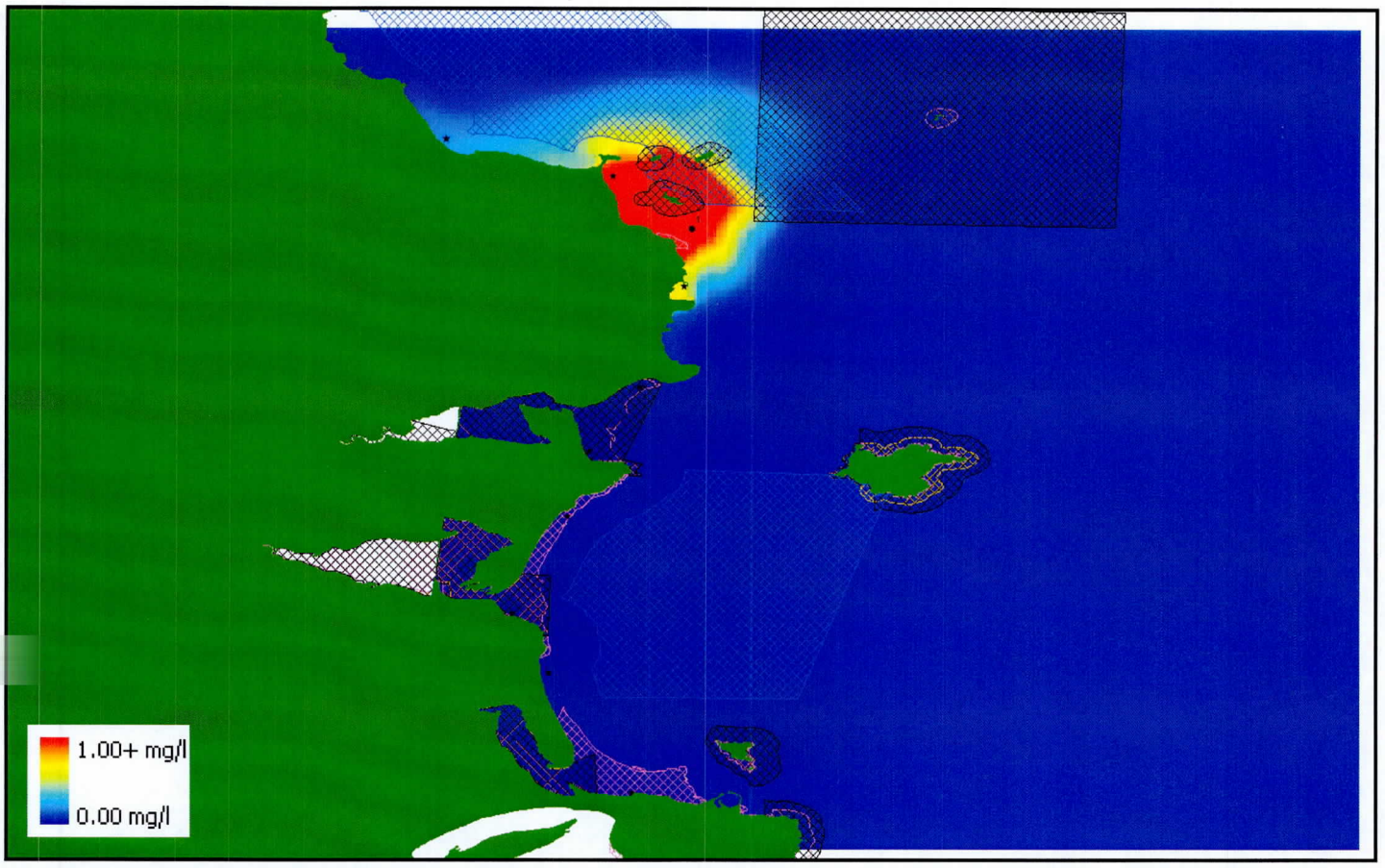


Figure 26: Outfall No. 1 solute plume at mid flood on a neap tide

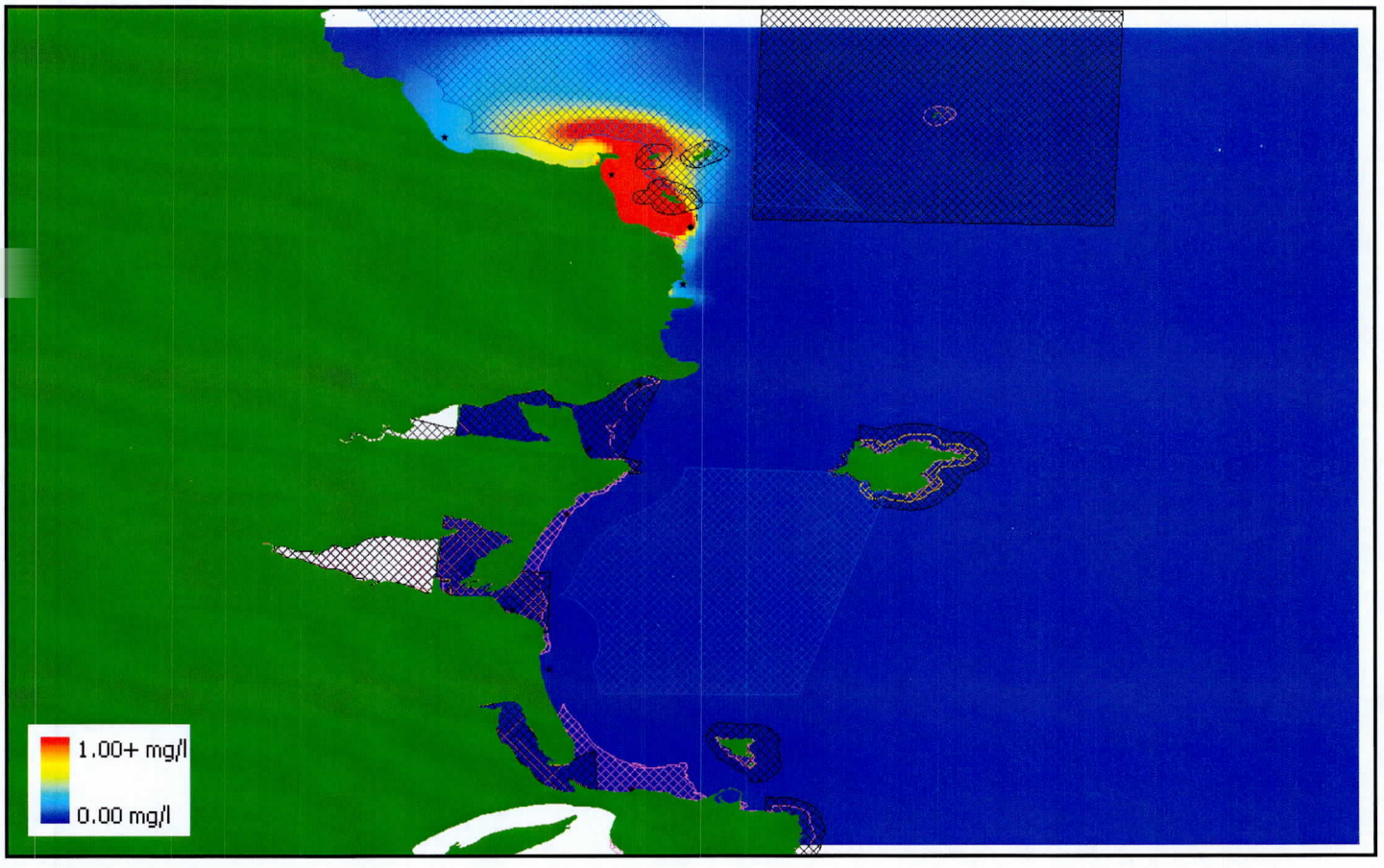


Figure 27: Outfall No. 1 solute plume at high water on a neap tide

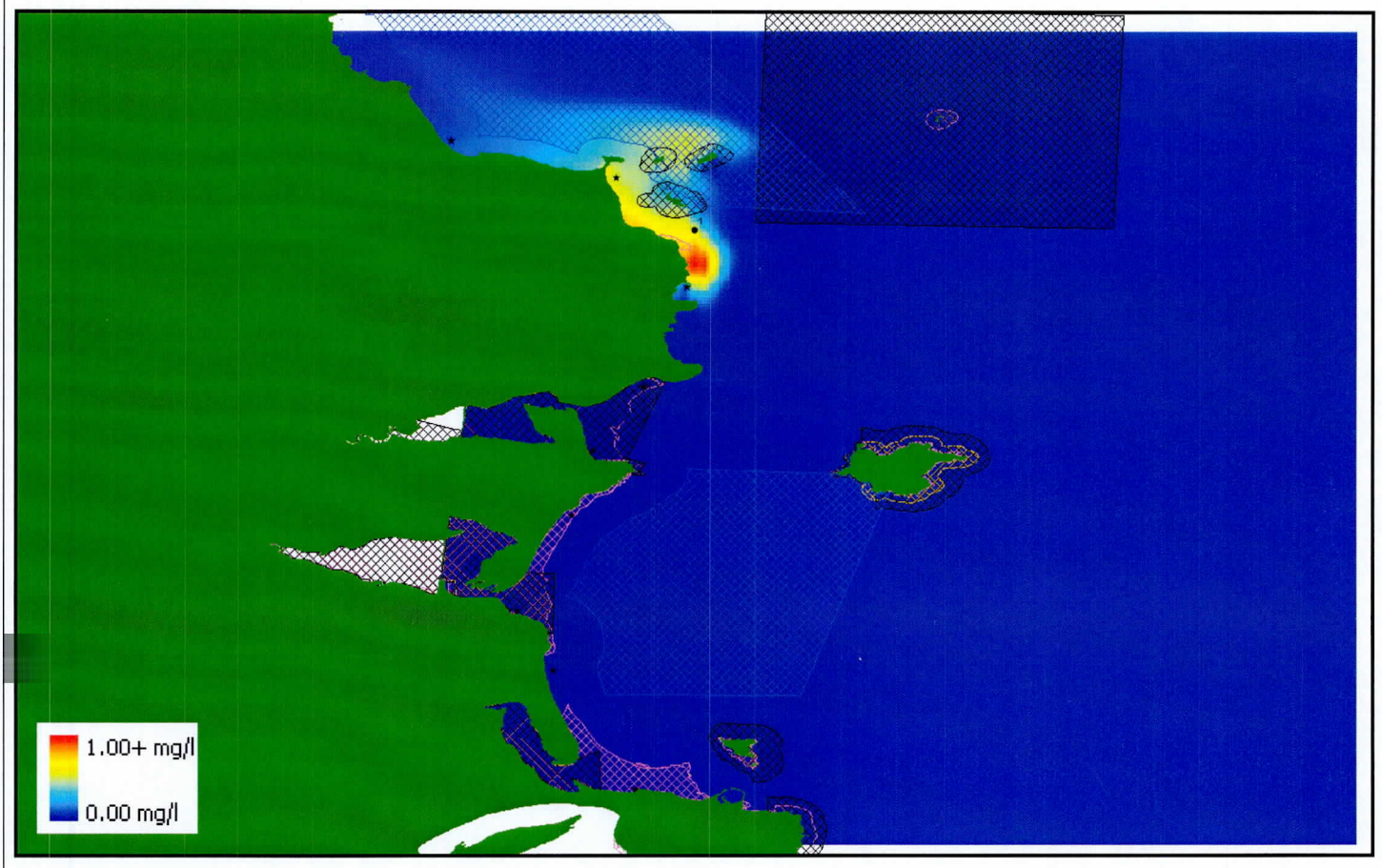


Figure 28: Outfall No. 1 solute plume at mid ebb on a spring tide

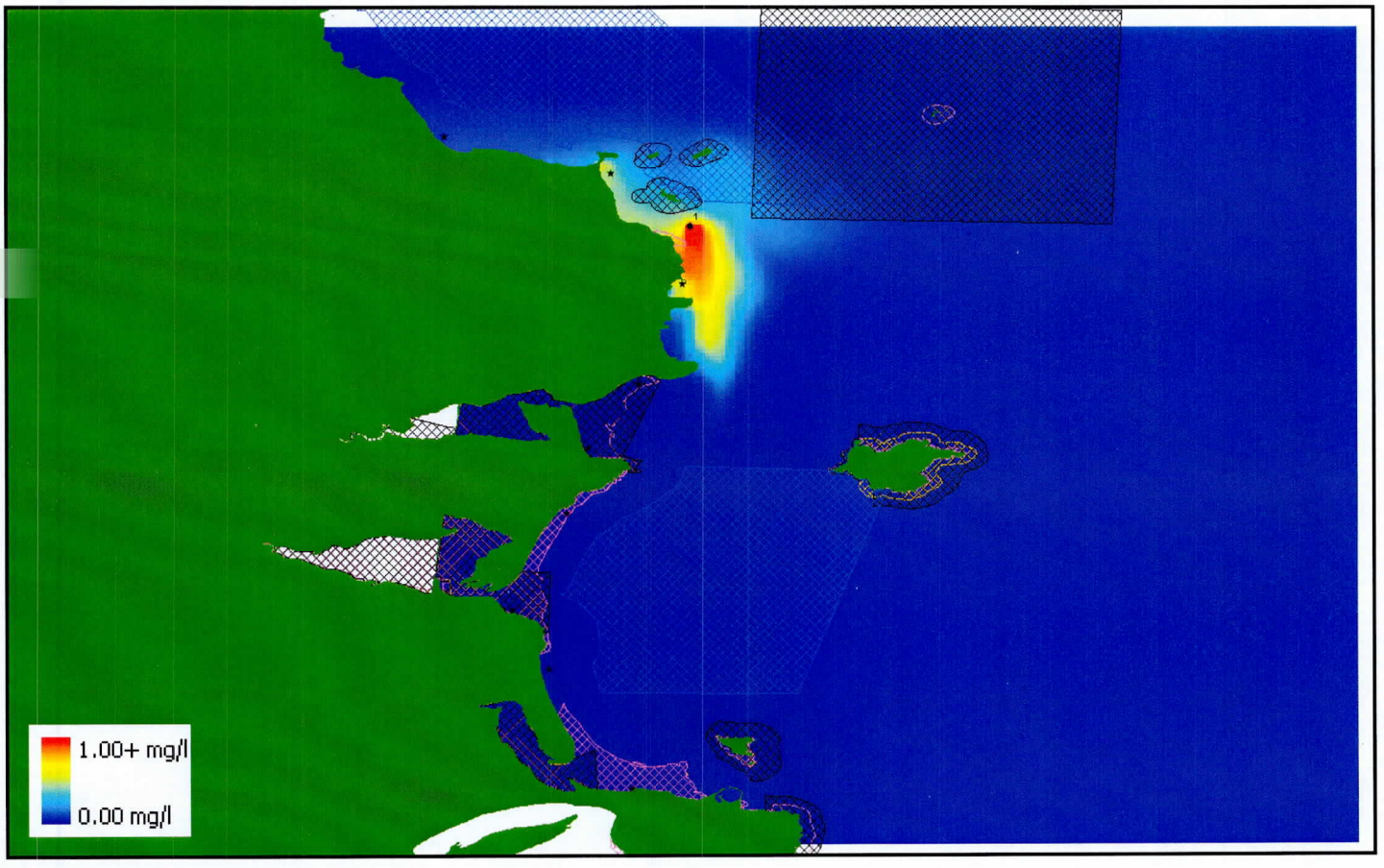


Figure 29: Outfall No. 1 solute plume at low water on a spring tide

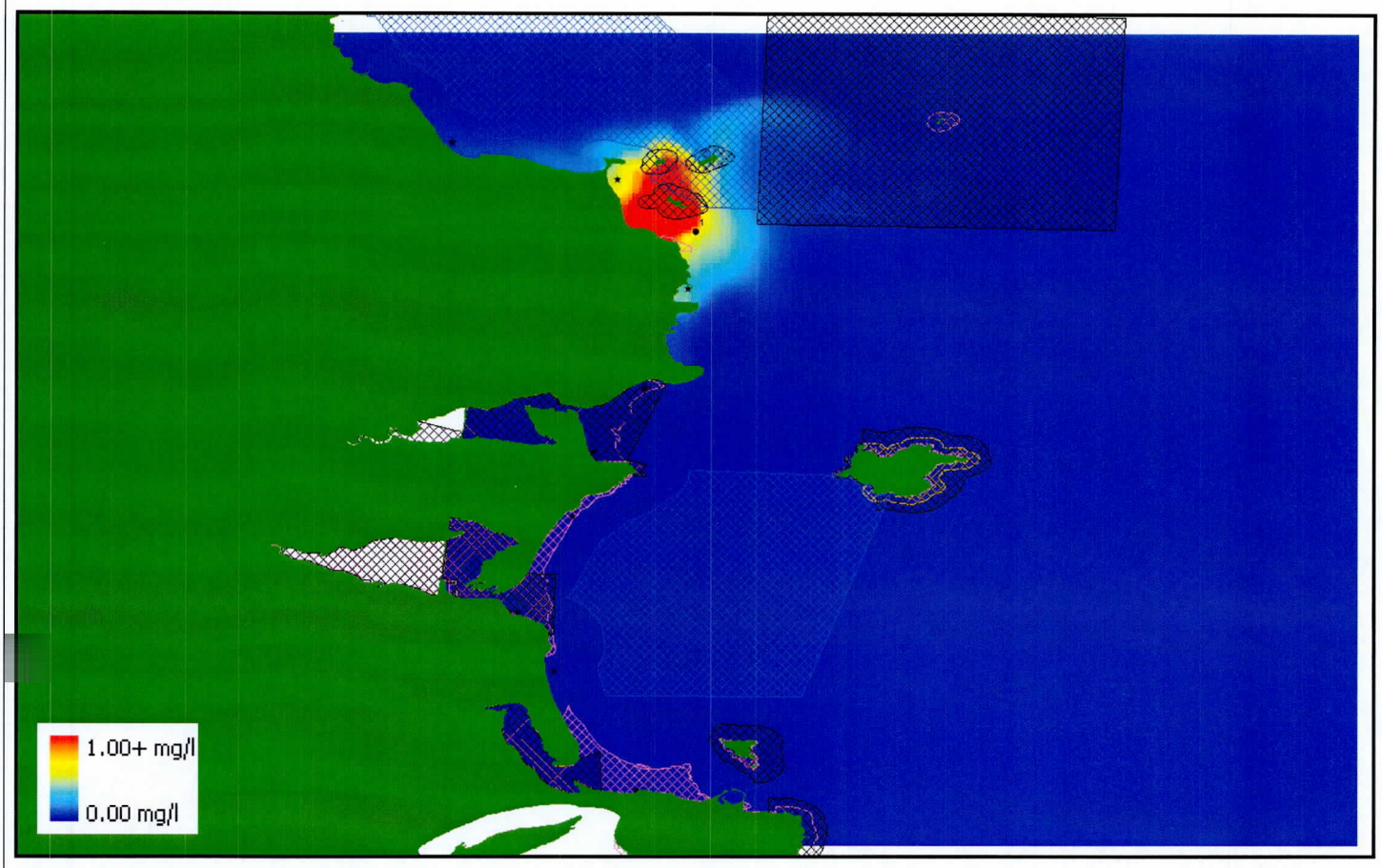


Figure 30: Outfall No. 1 solute plume at mid flood on a spring tide

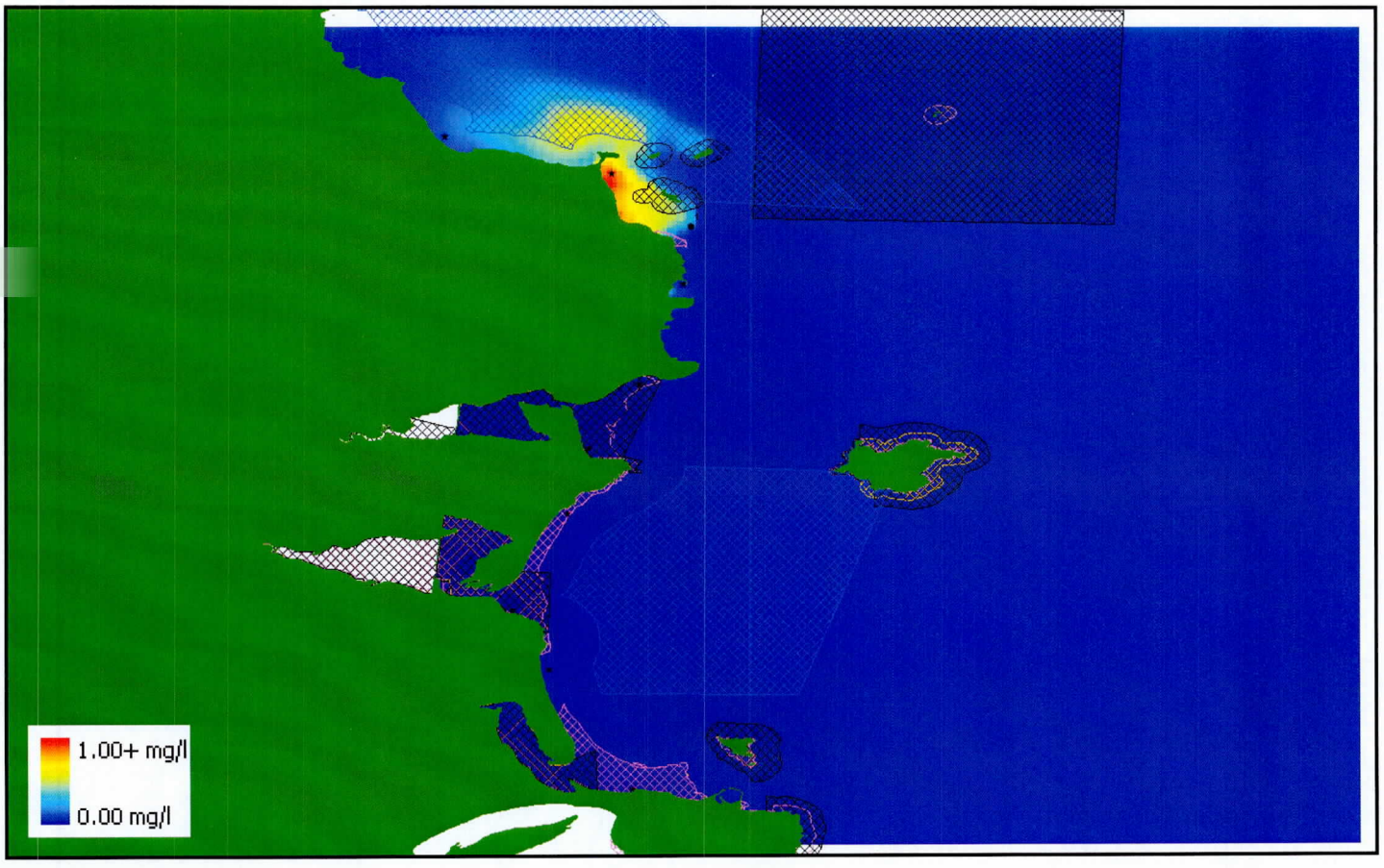


Figure 31: Outfall No. 1 solute plume at high water on a spring tide

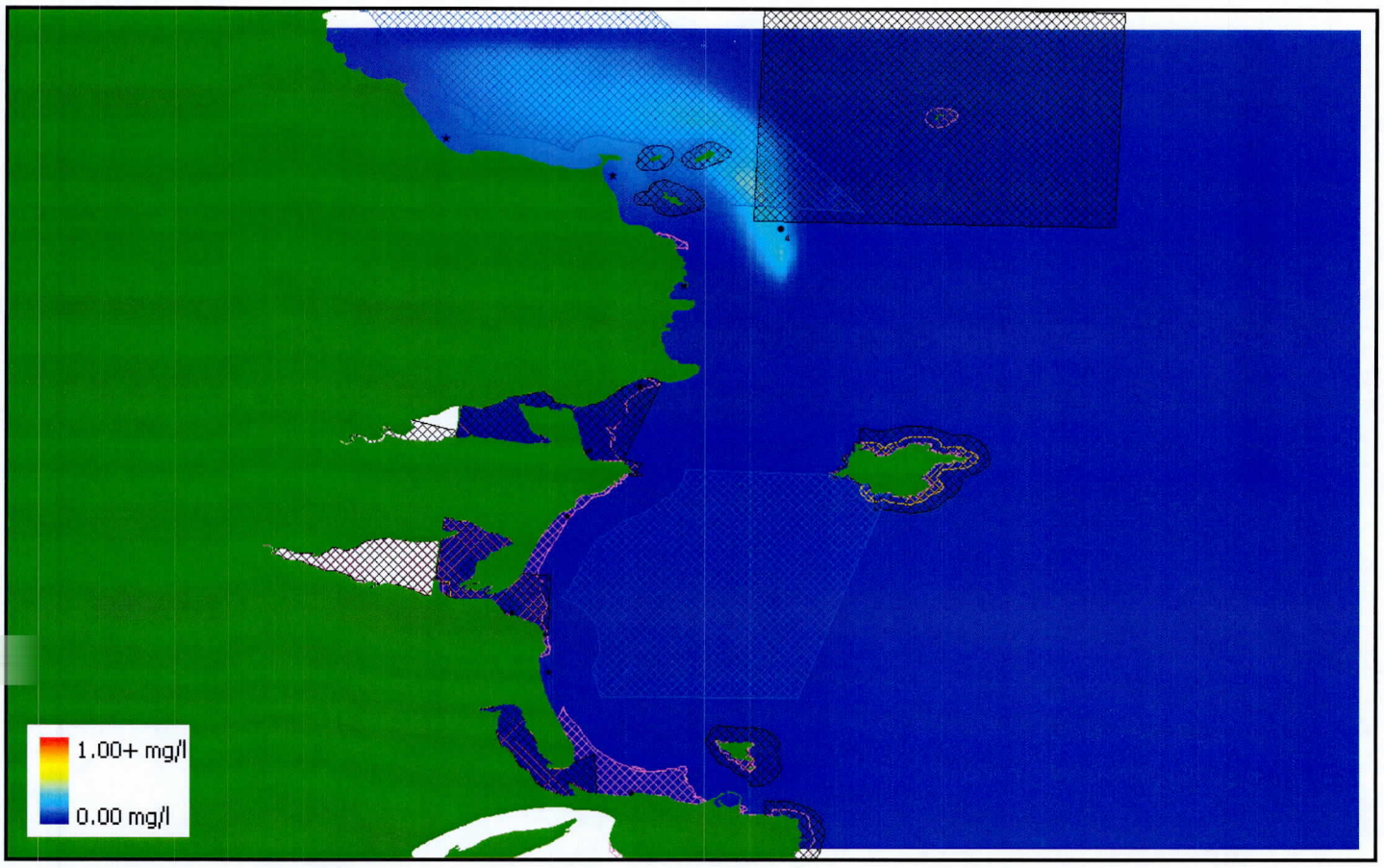


Figure 32: Outfall No. 4 solute plume at mid ebb on a neap tide

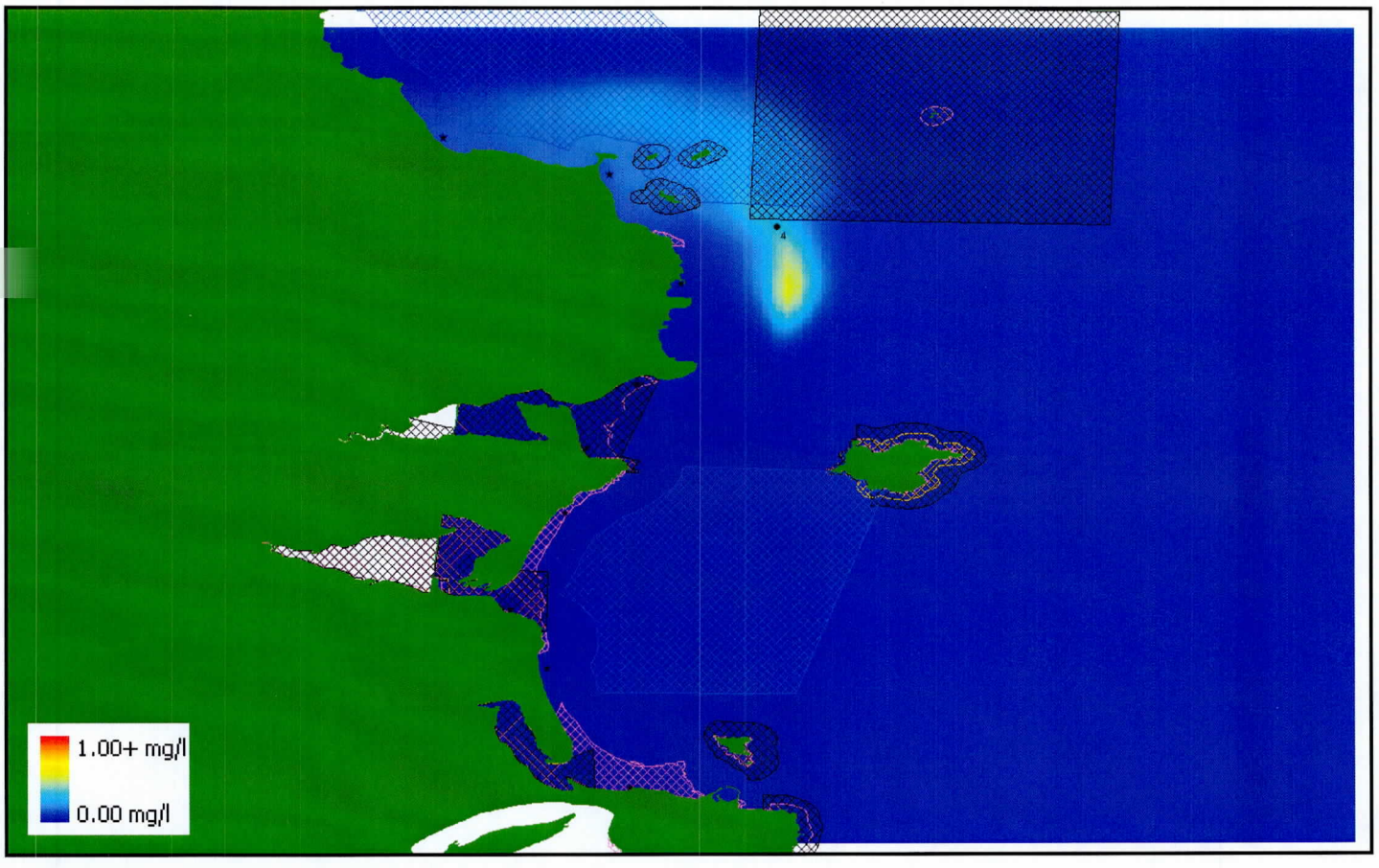


Figure 33: Outfall No. 4 solute plume at low water on a neap tide

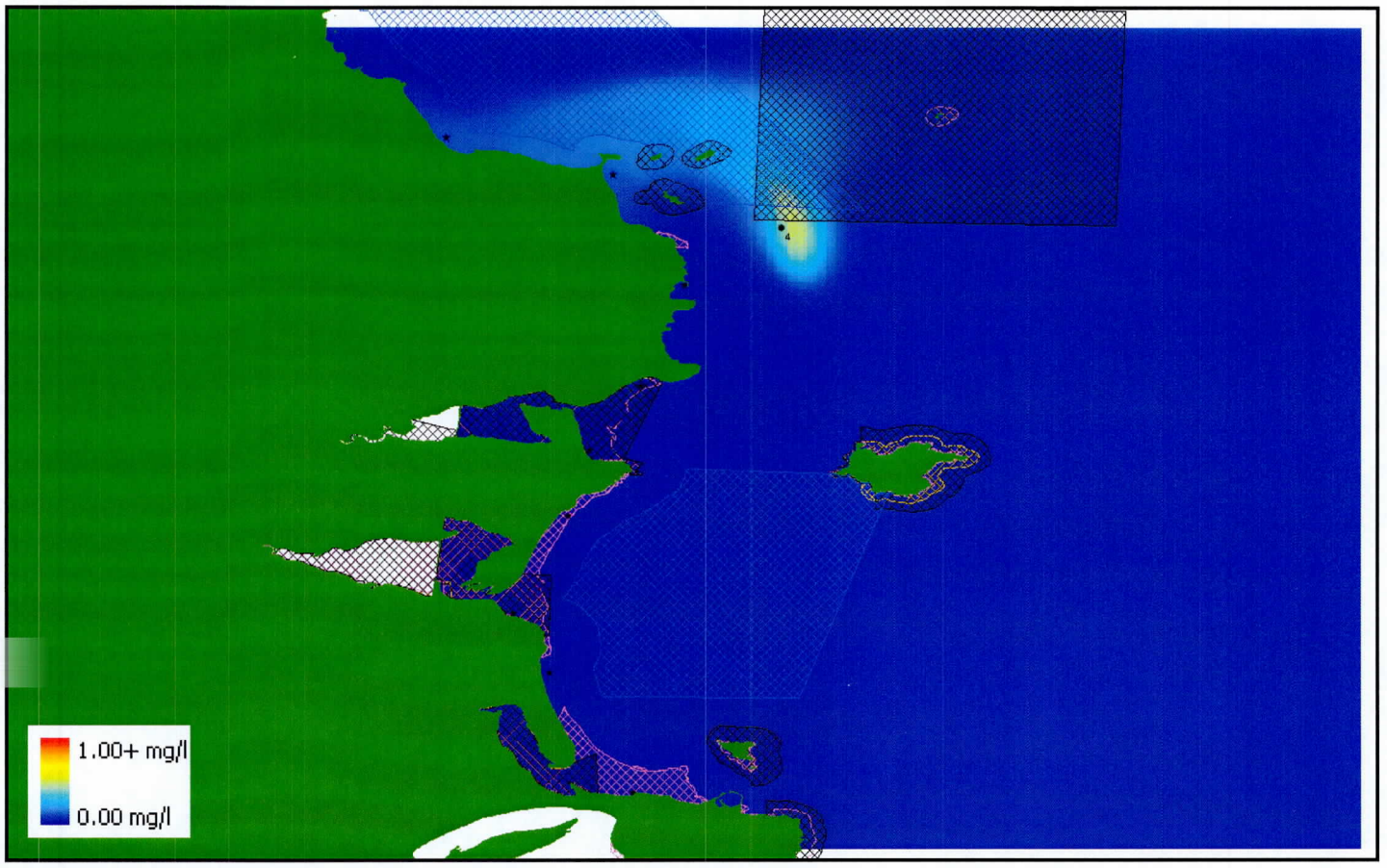


Figure 34: Outfall No. 4 solute plume at mid flood on a neap tide

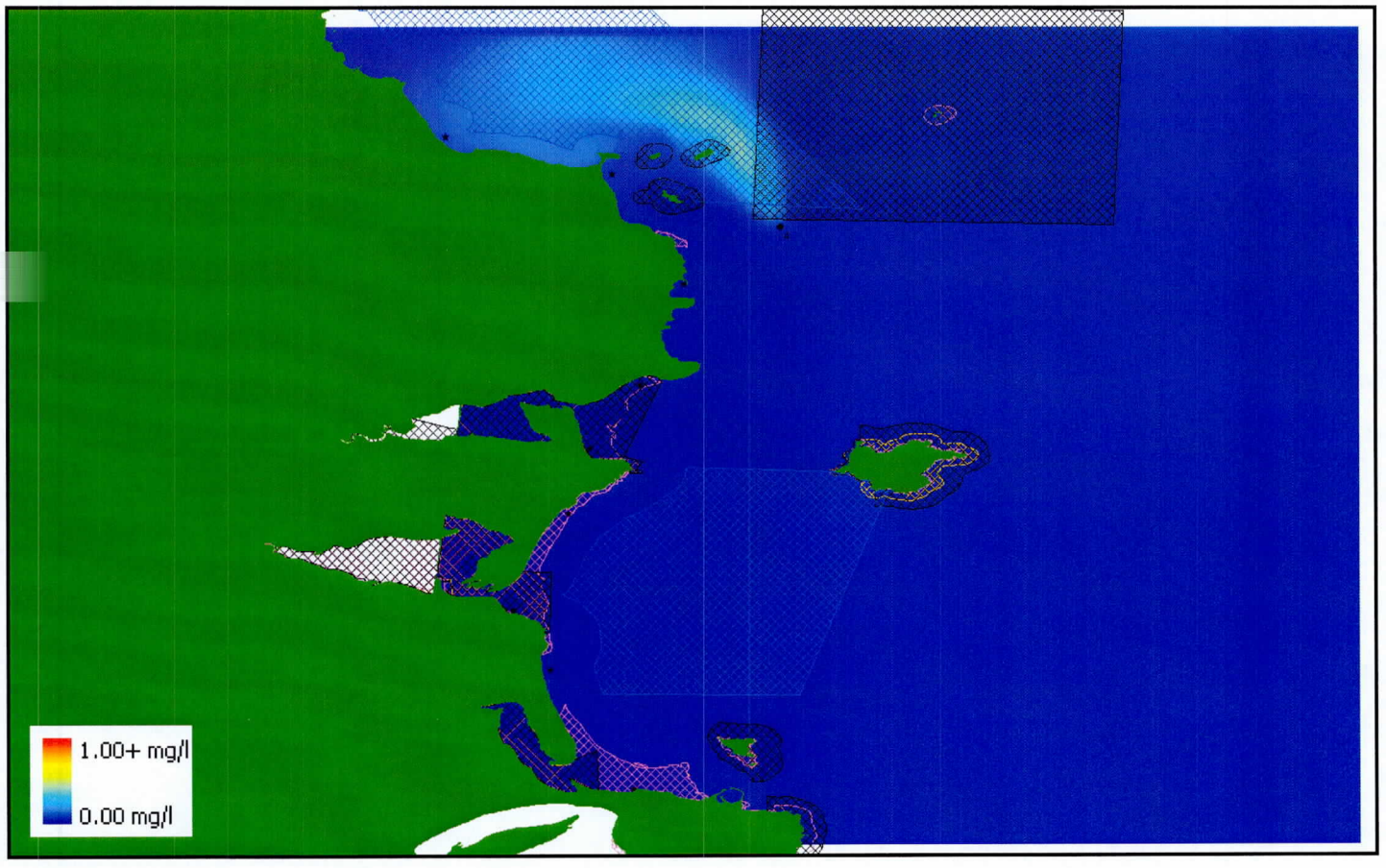


Figure 35: Outfall No. 4 solute plume at high water on a neap tide

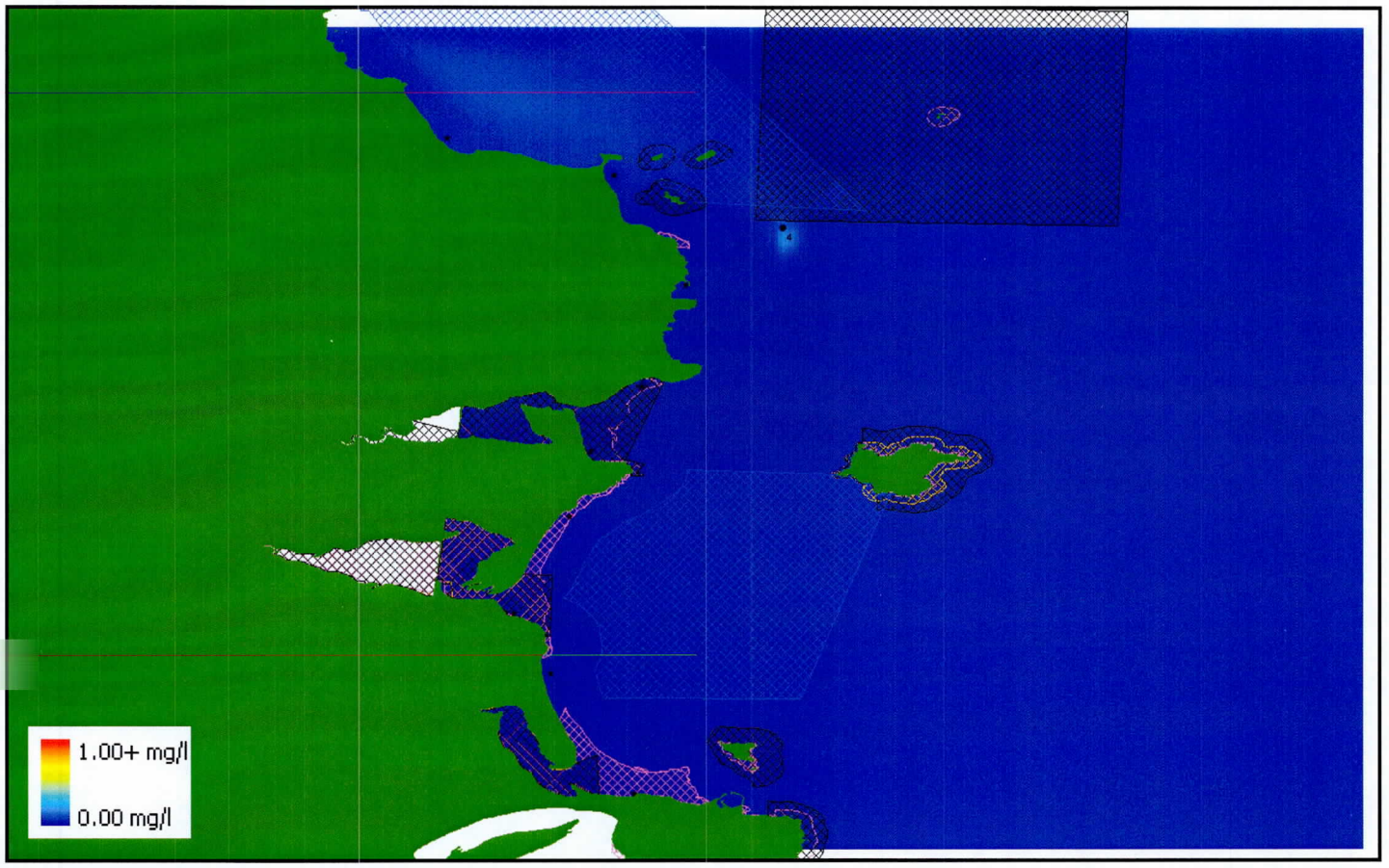


Figure 36: Outfall No. 4 solute plume at mid ebb on a spring tide

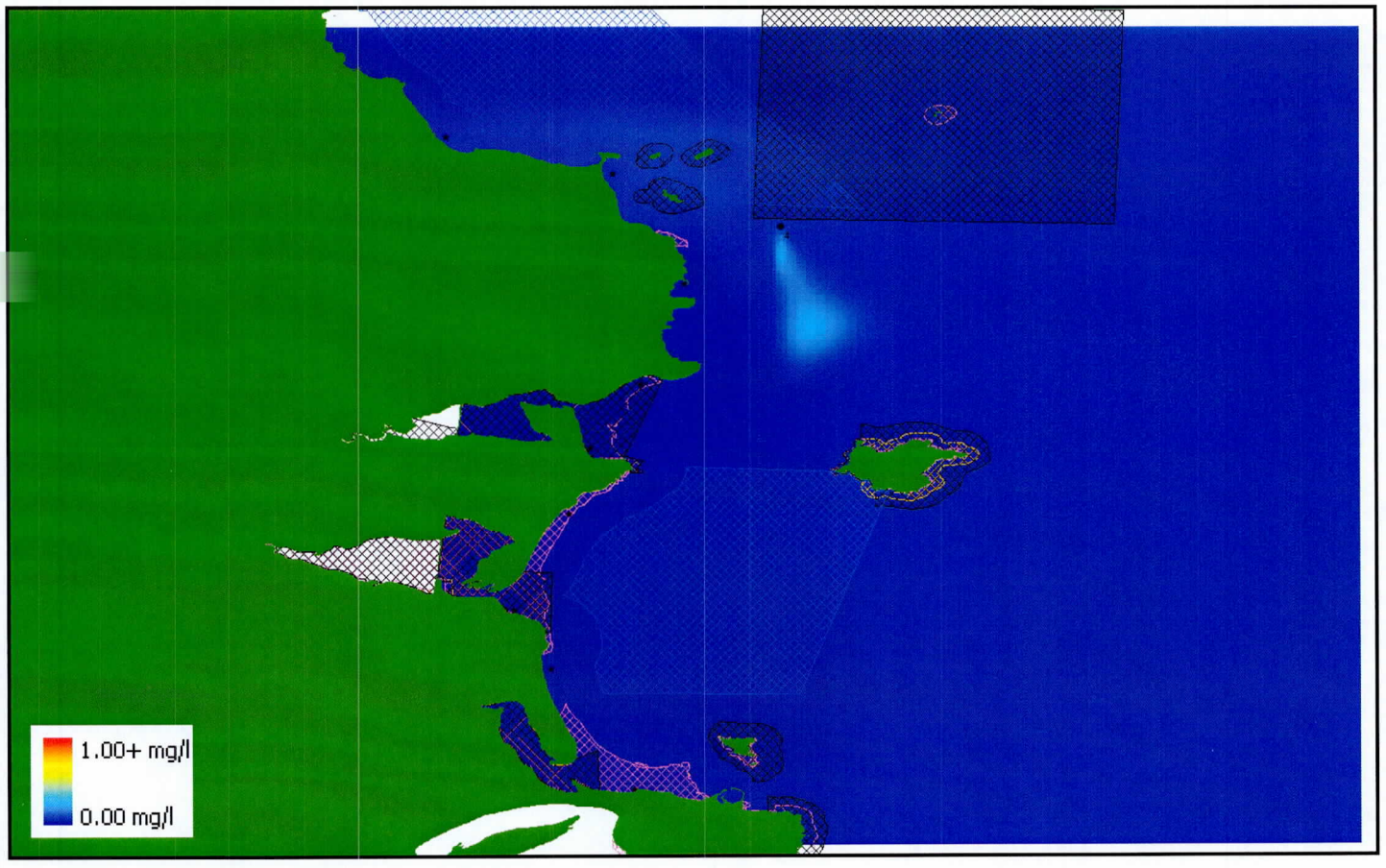


Figure 37: Outfall No. 4 solute plume at low water on a spring tide

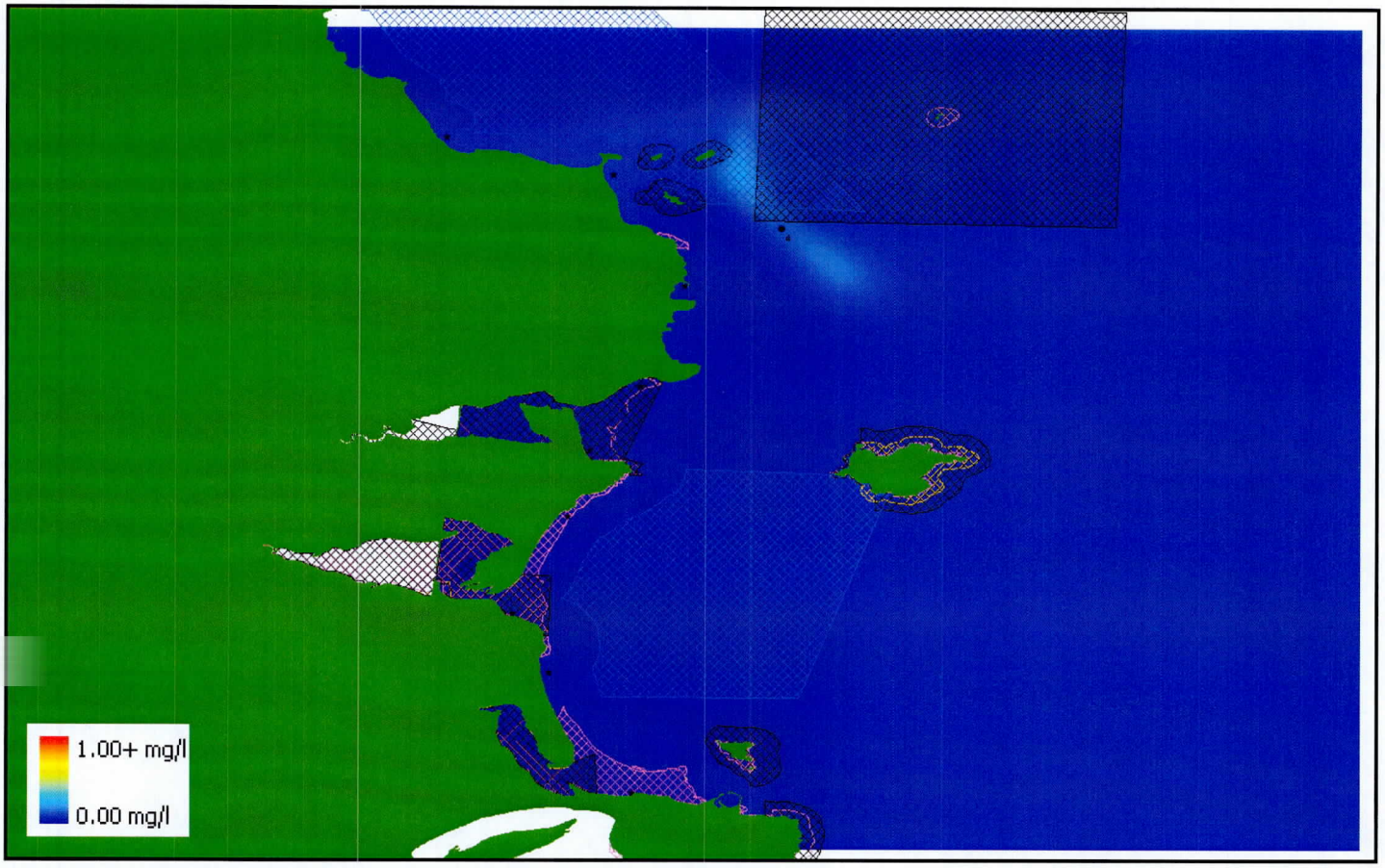


Figure 38: Outfall No. 4 solute plume at mid flood on a spring tide

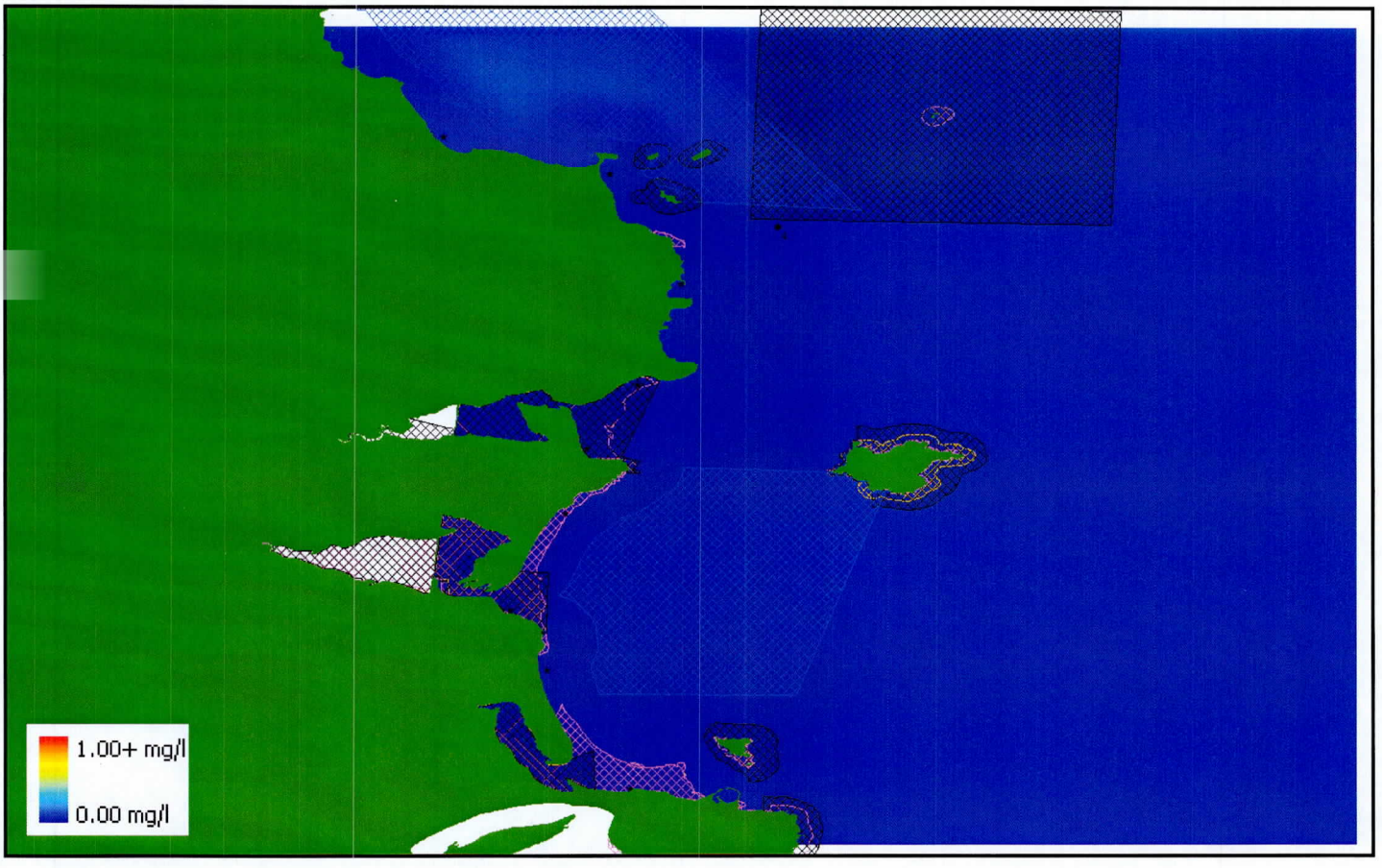


Figure 39: Outfall No. 4 solute plume at high water on a spring tide

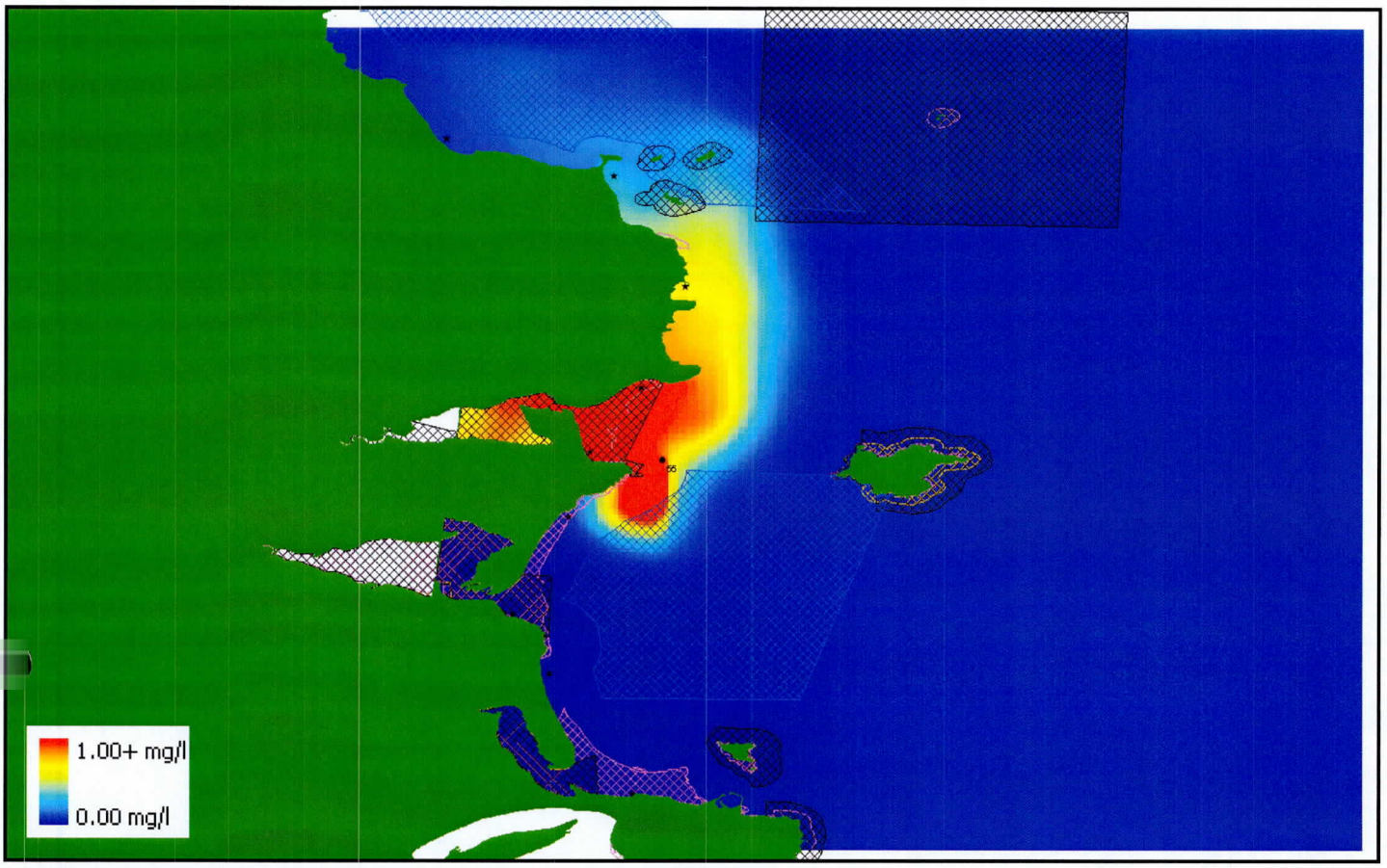


Figure 40: Outfall No. 55 solute plume at mid ebb on a neap tide

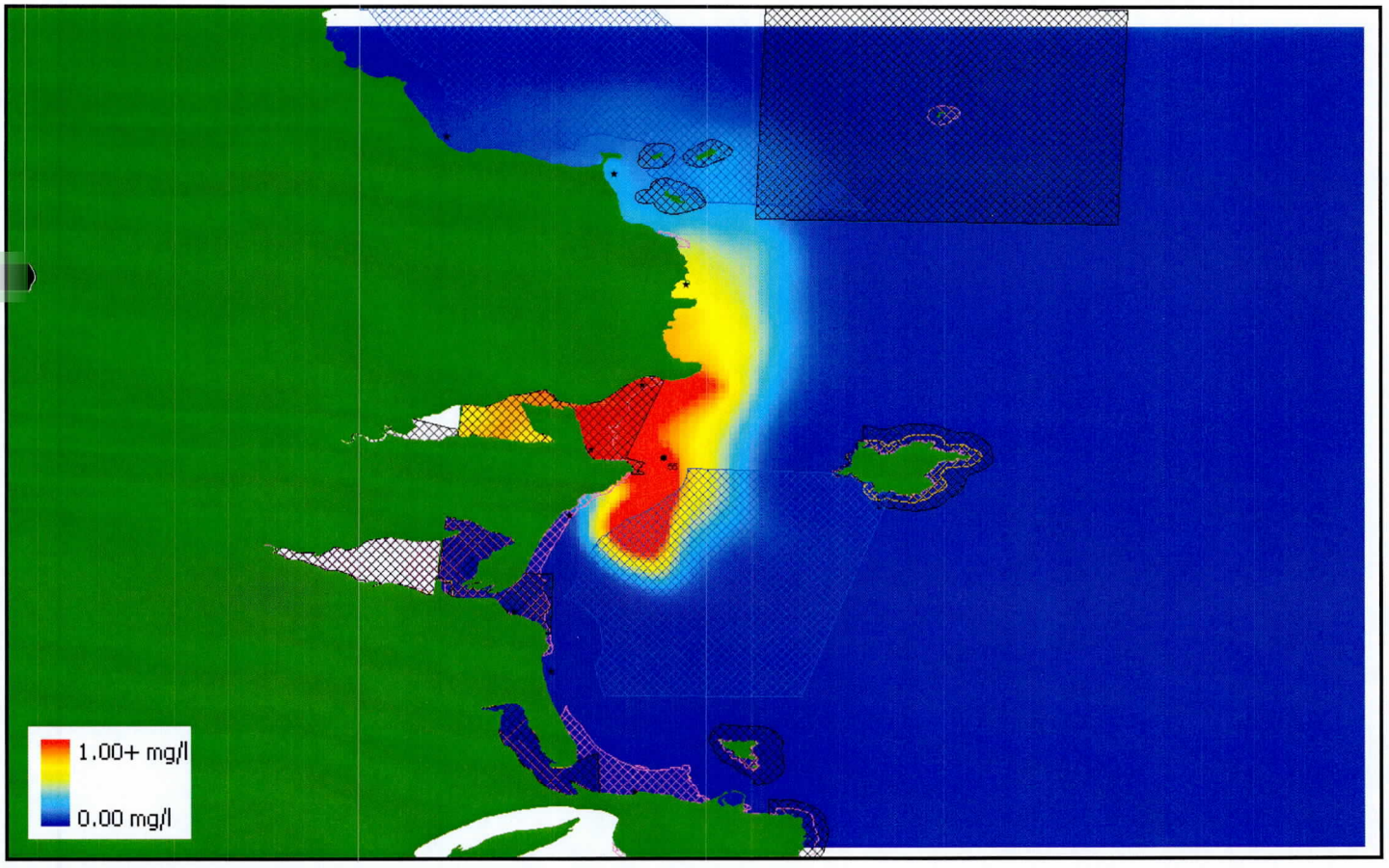


Figure 41: Outfall No. 55 solute plume at low water on a neap tide

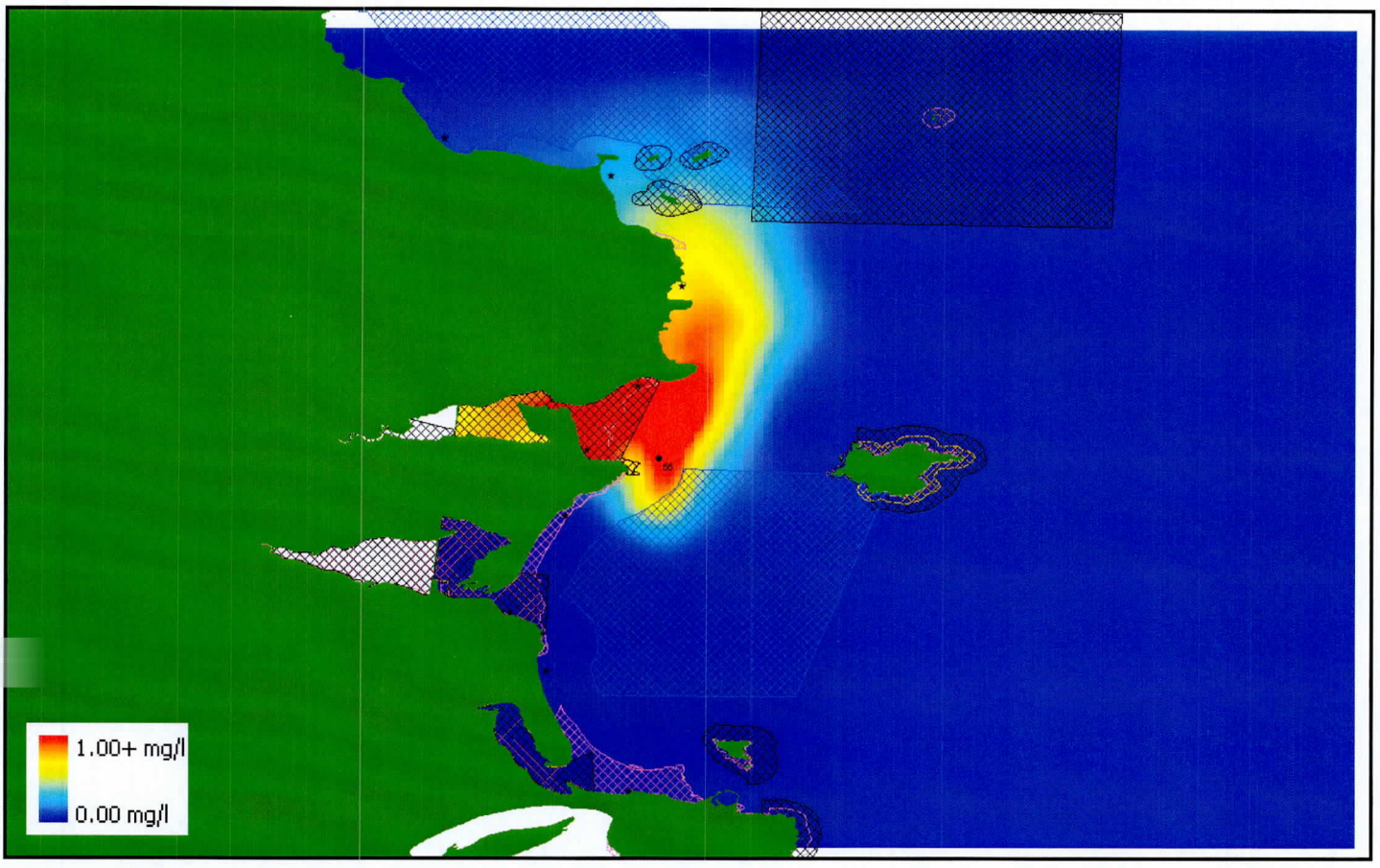


Figure 42: Outfall No. 55 solute plume at mid flood on a neap tide

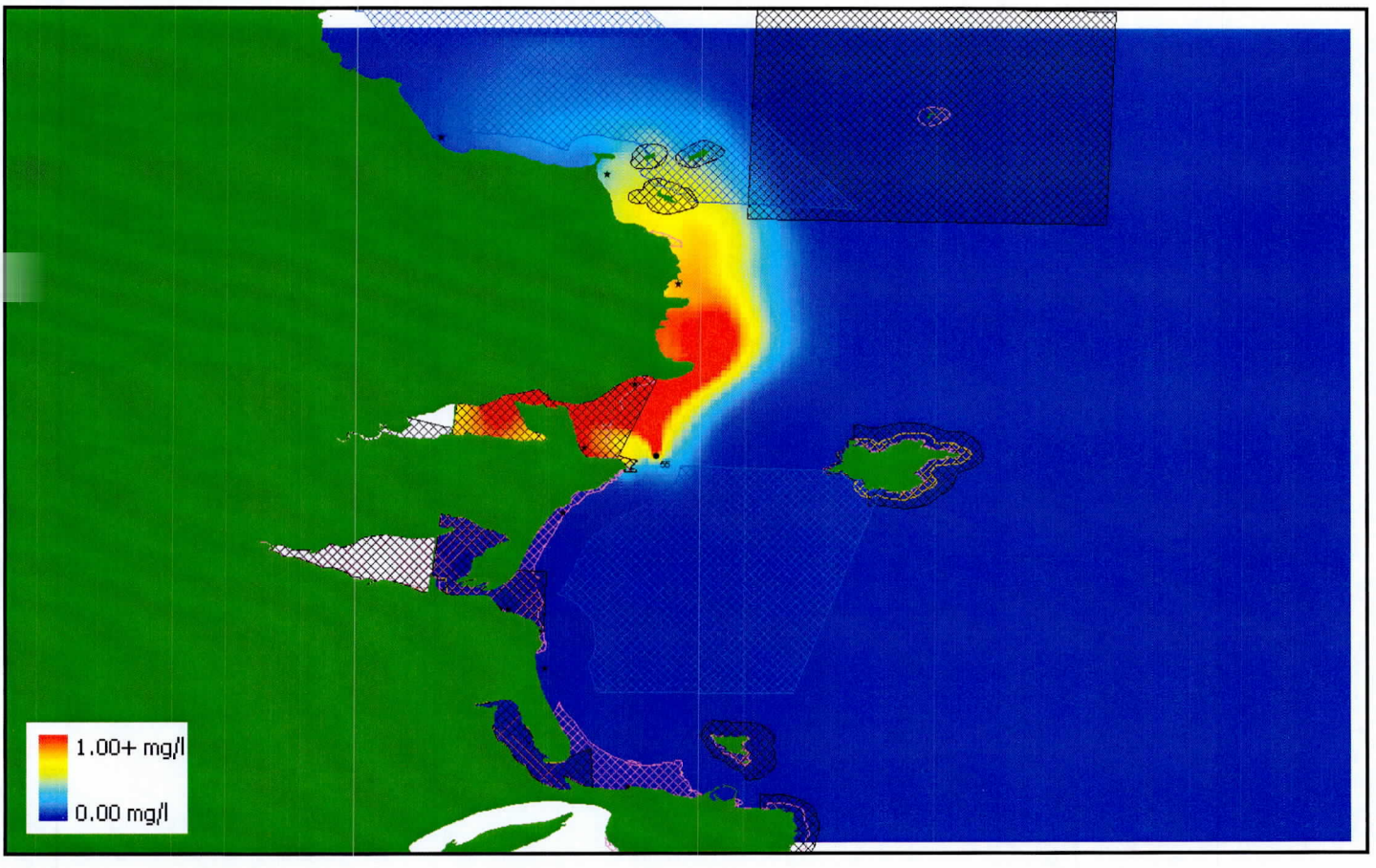


Figure 43: Outfall No. 55 solute plume at high water on a neap tide

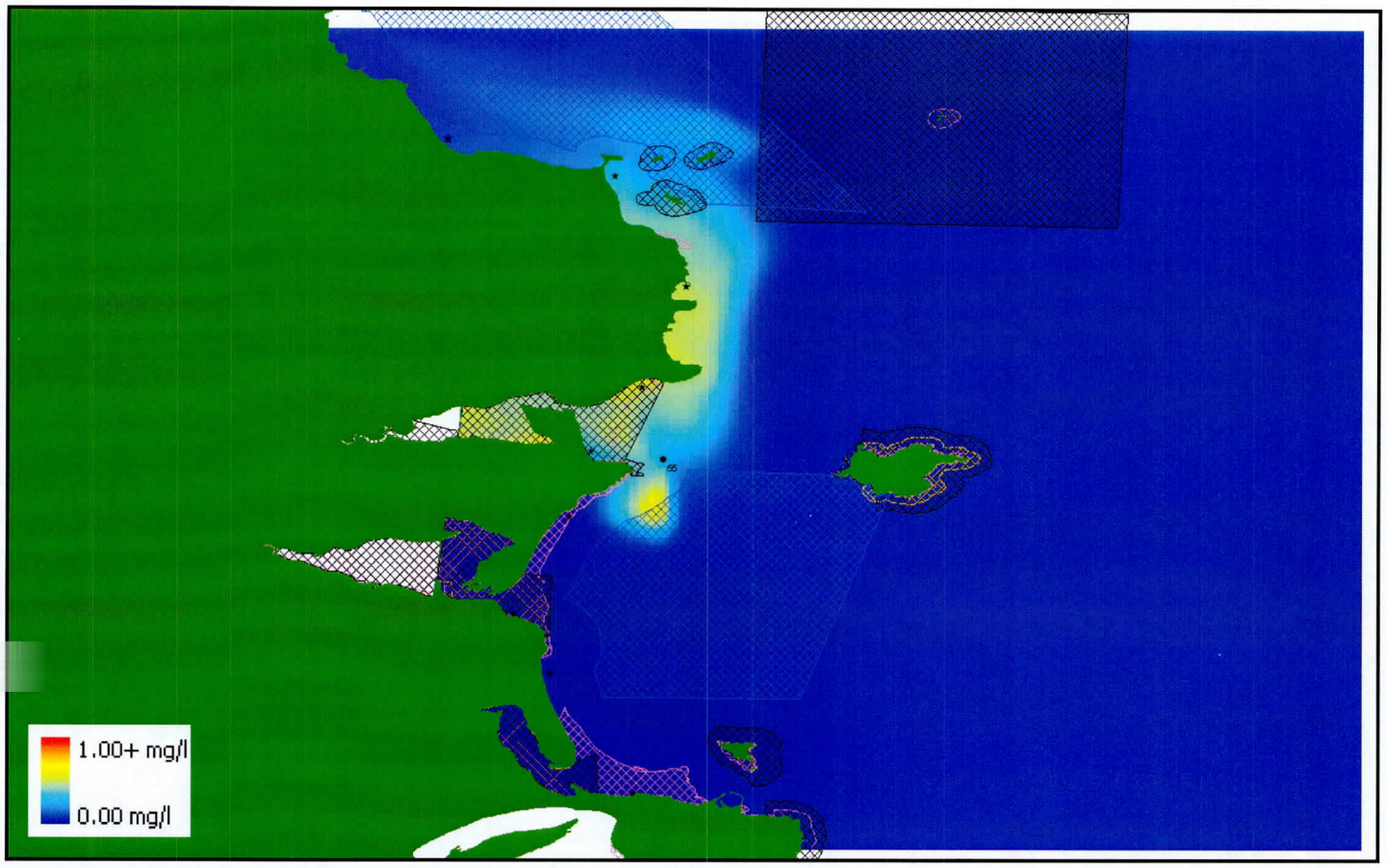


Figure 44: Outfall No. 55 solute plume at mid ebb on a spring tide

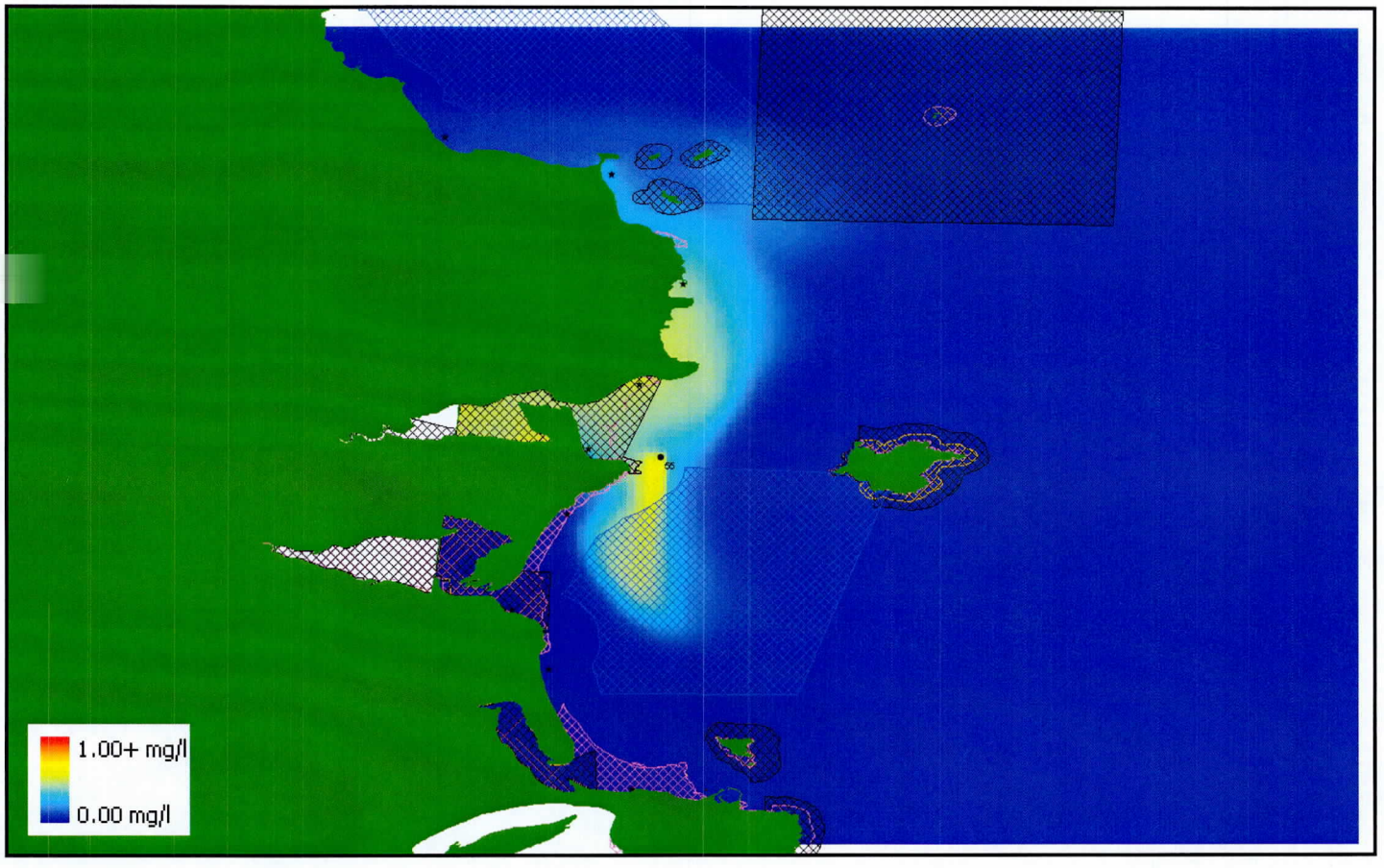


Figure 45: Outfall No. 55 solute plume at low water on a spring tide

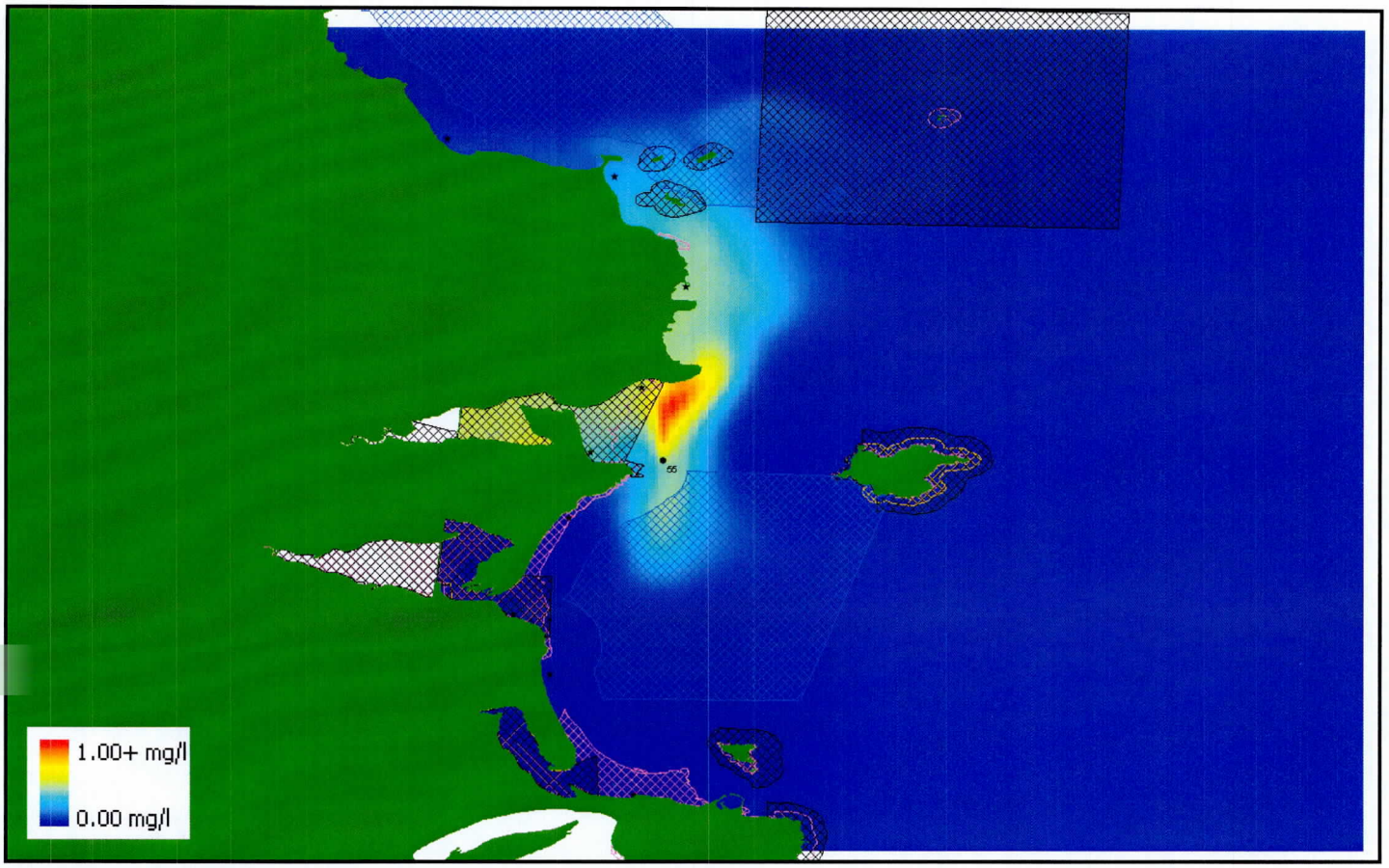


Figure 46: Outfall No. 55 solute plume at mid flood on a spring tide

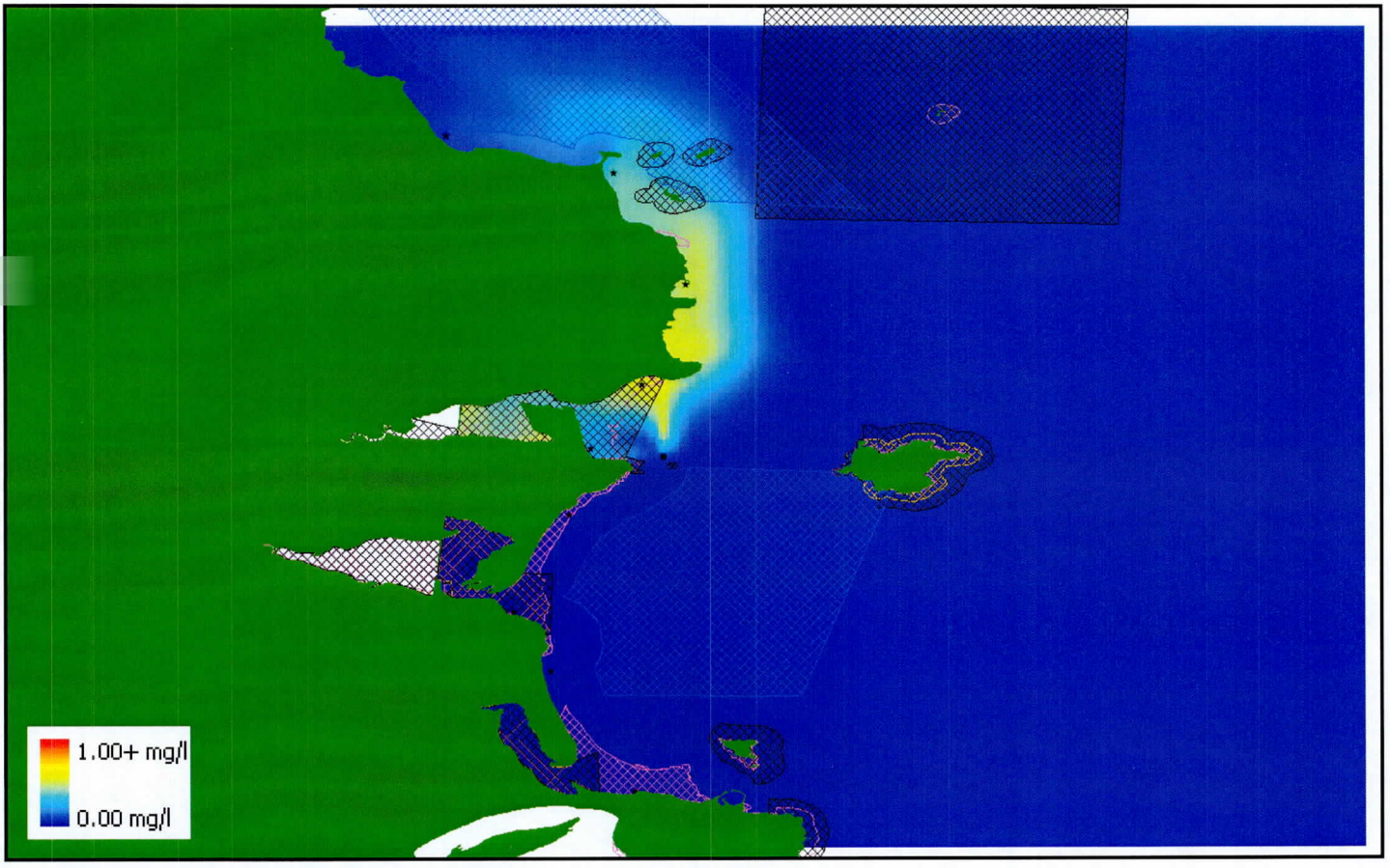


Figure 47: Outfall No. 55 solute plume at high water on a spring tide

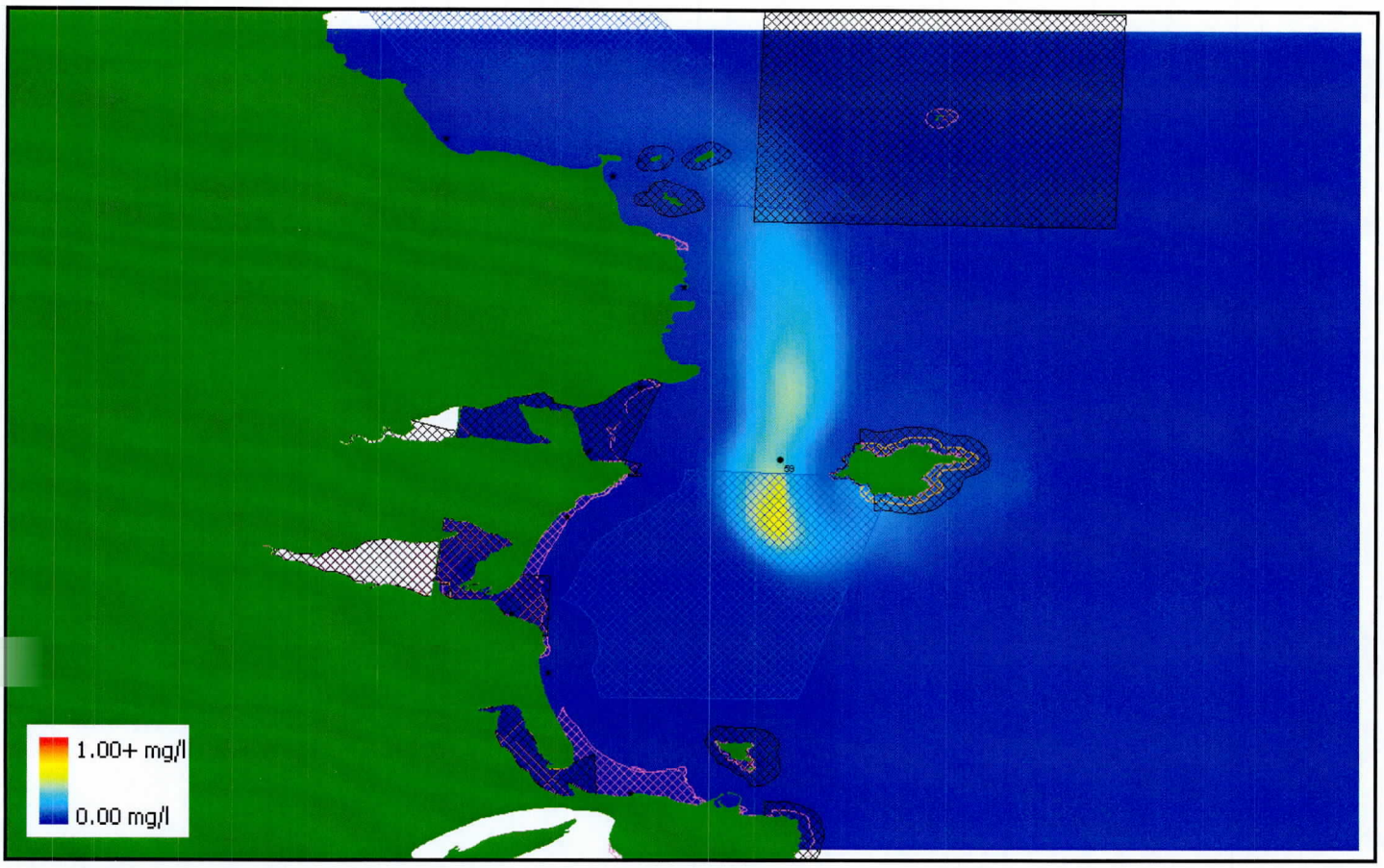


Figure 48: Outfall No. 59 solute plume at mid ebb on a neap tide

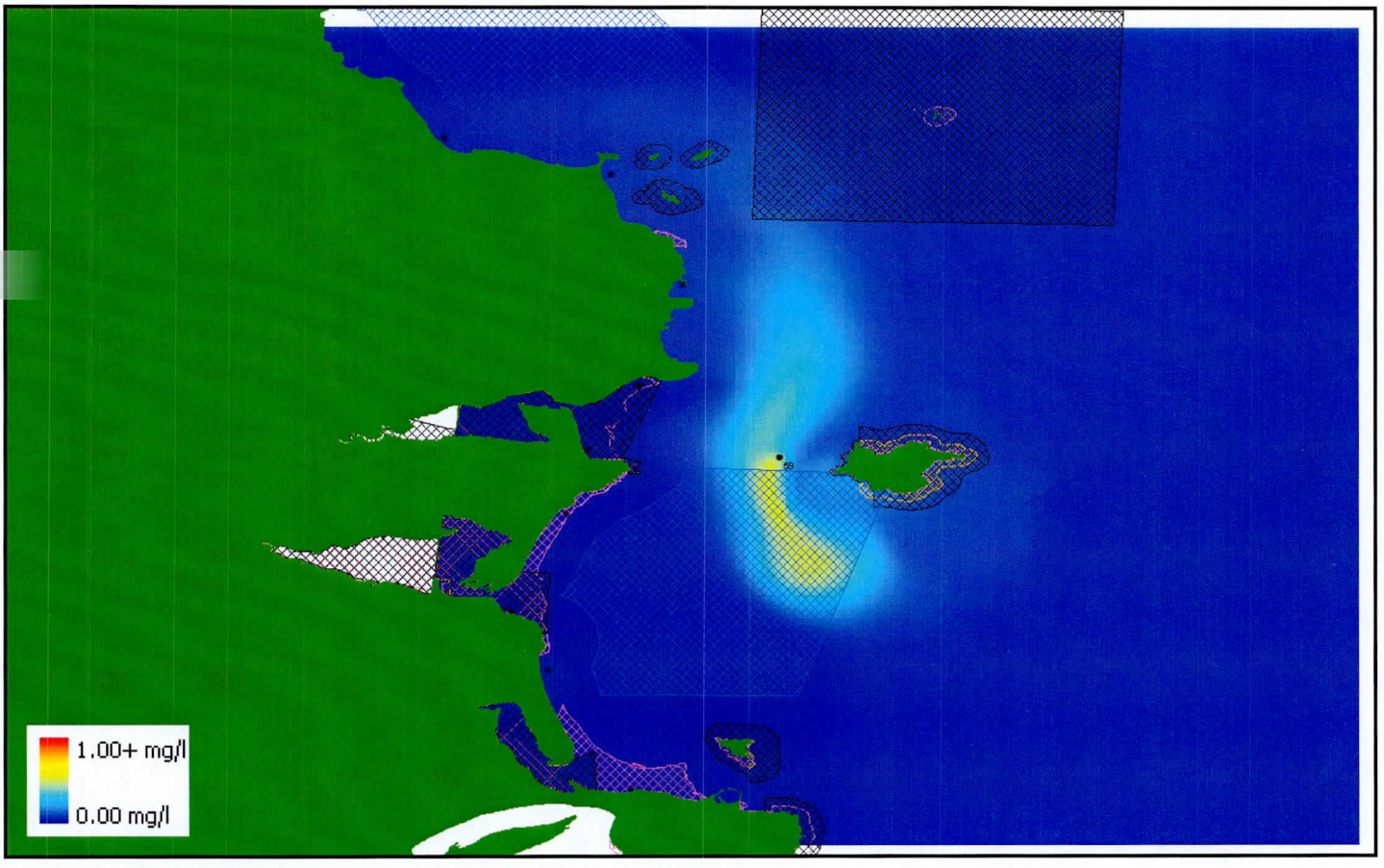


Figure 49: Outfall No. 59 solute plume at low water on a neap tide

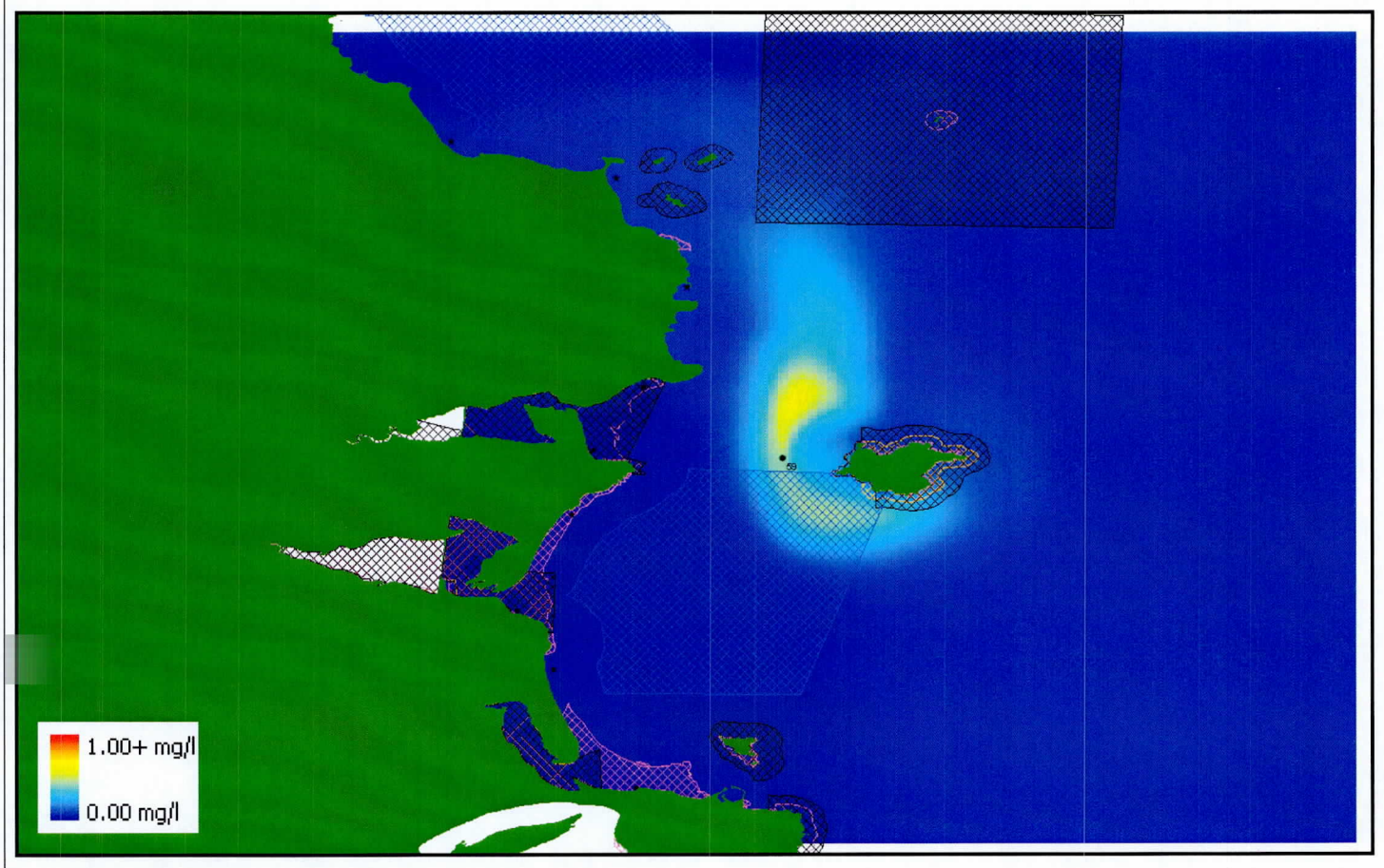


Figure 50: Outfall No. 59 solute plume at mid flood on a neap tide

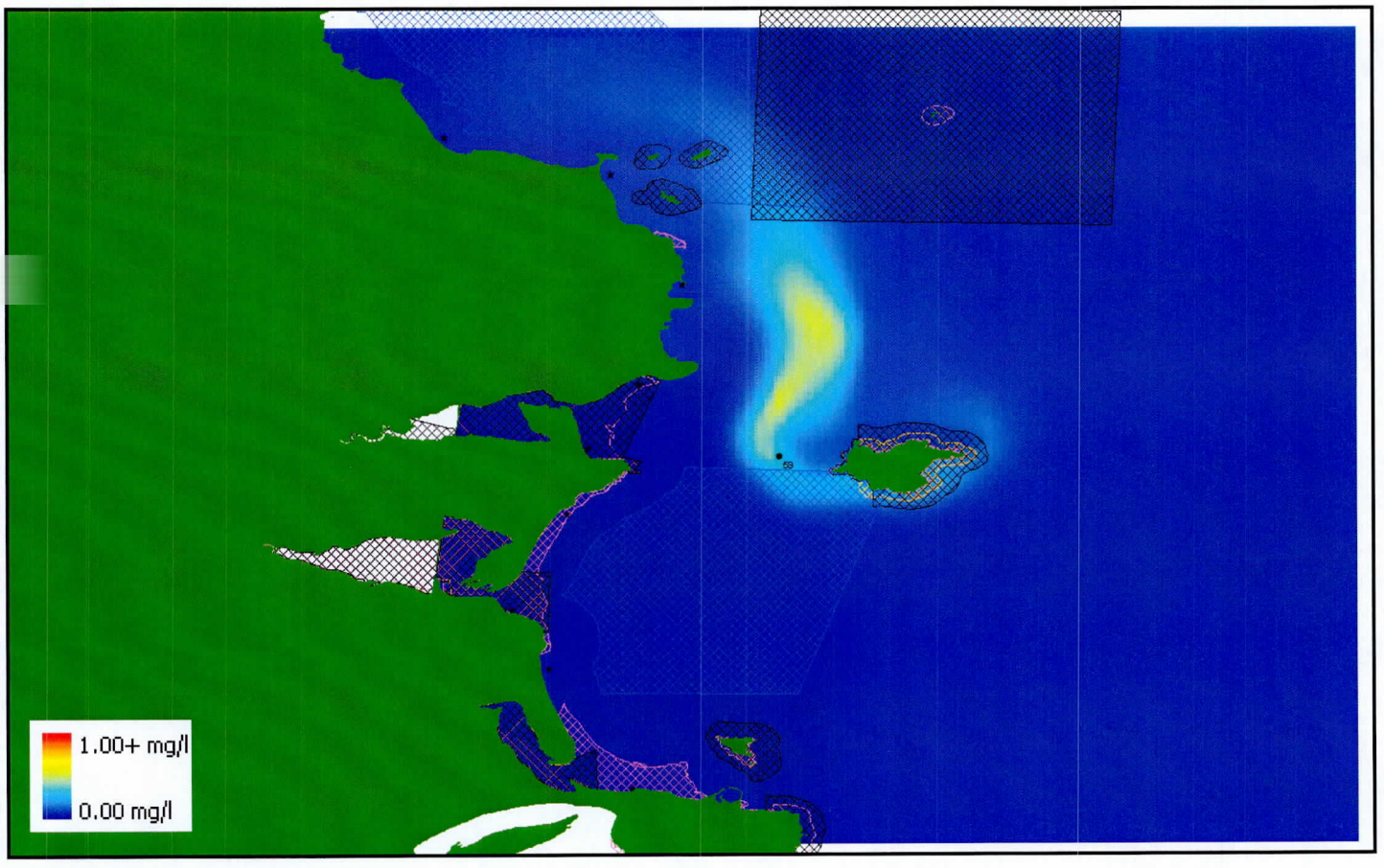


Figure 51: Outfall No. 59 solute plume at high water on a neap tide

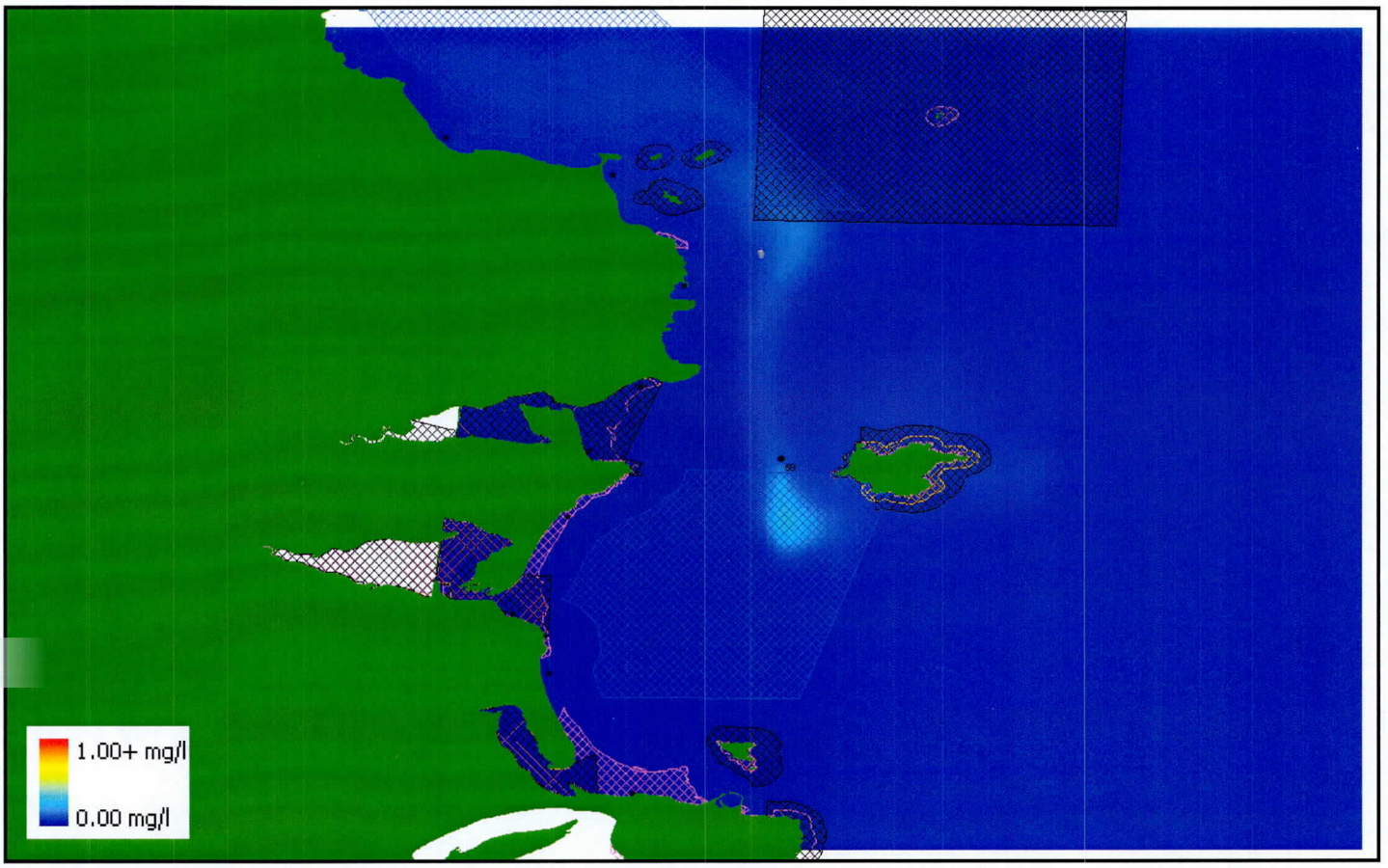


Figure 52: Outfall No. 59 solute plume at mid ebb on a spring tide

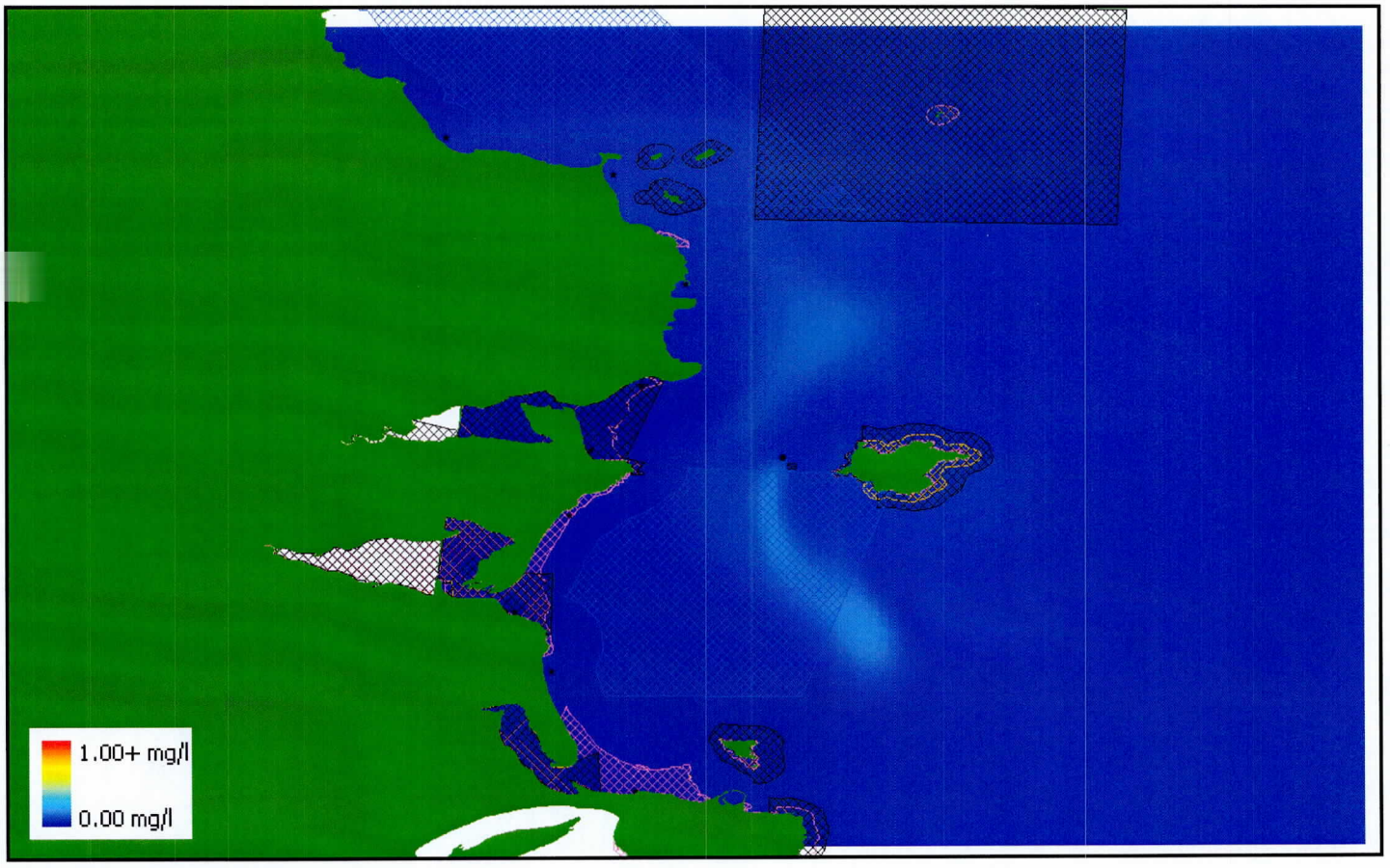


Figure 53: Outfall No. 59 solute plume at low water on a spring tide

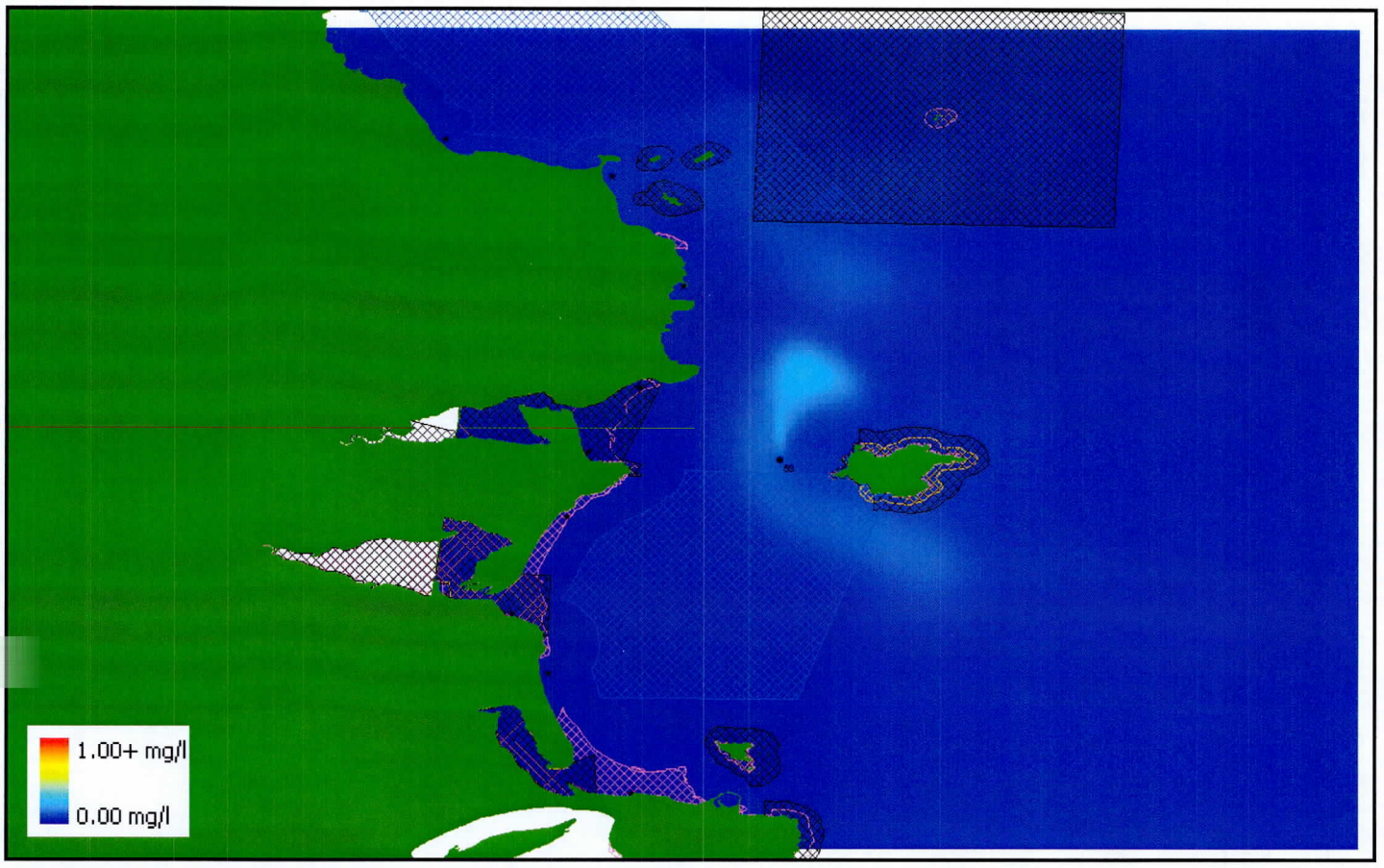


Figure 54: Outfall No. 59 solute plume at mid flood on a spring tide

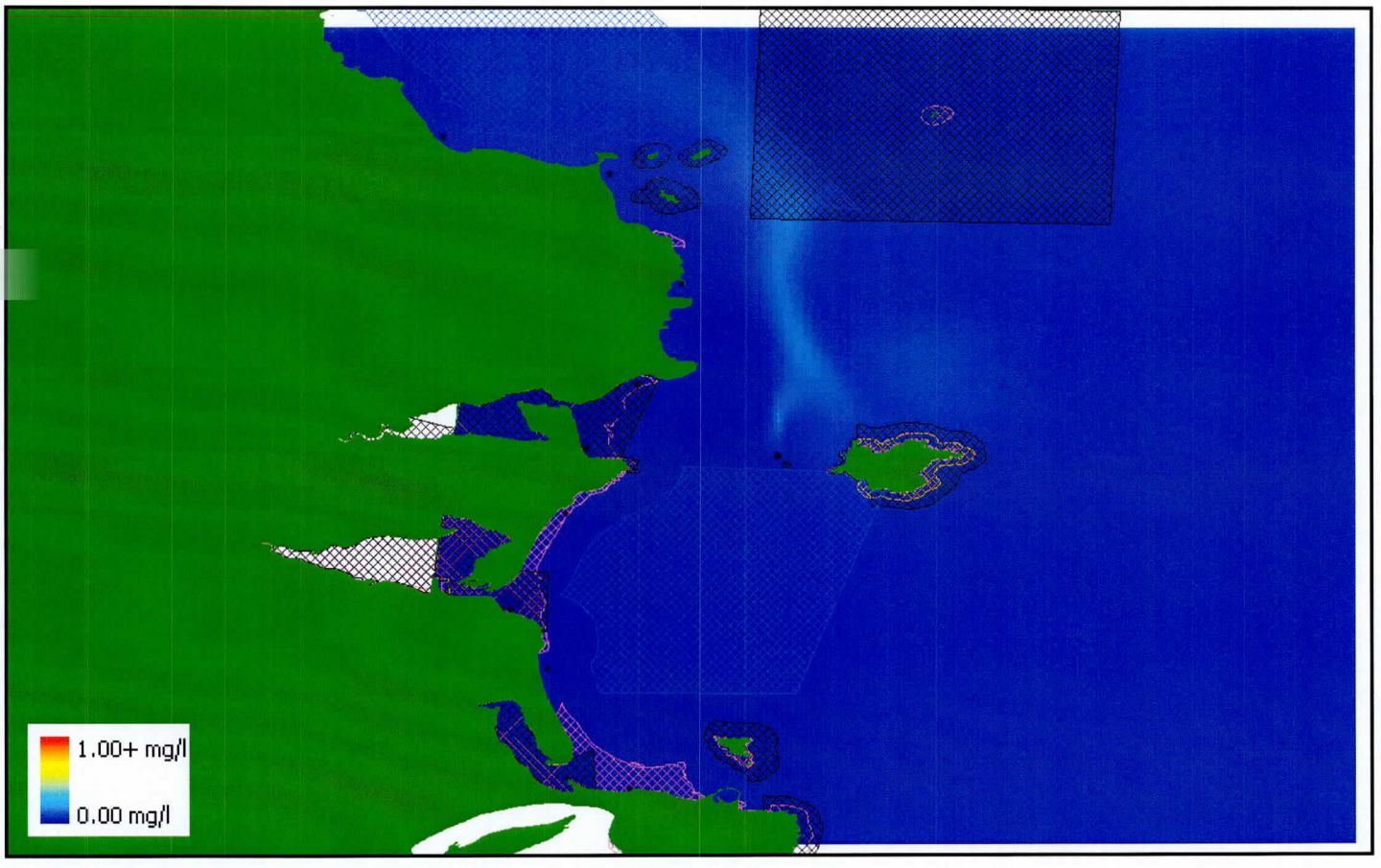


Figure 55: Outfall No. 59 solute plume at high water on a spring tide

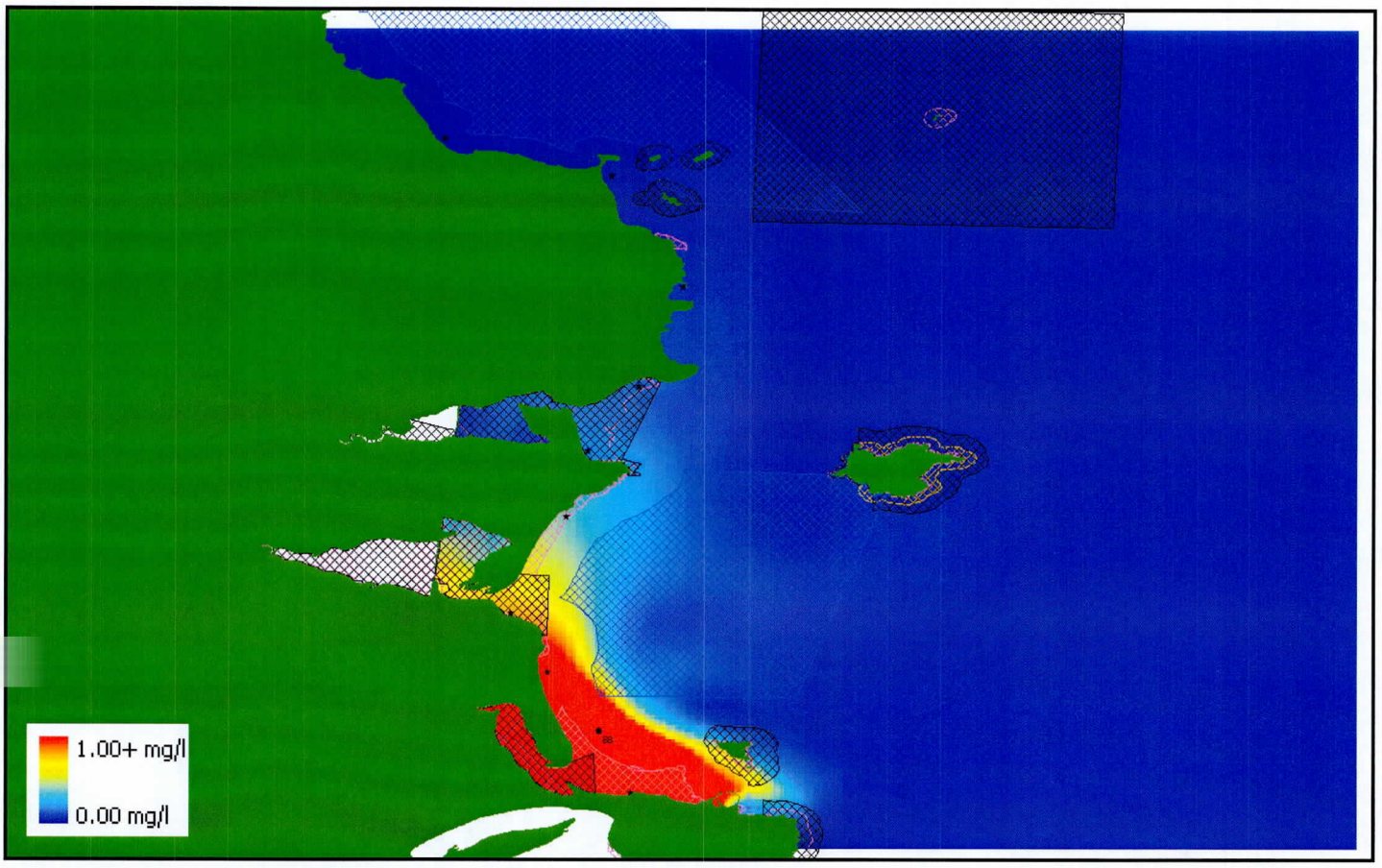


Figure 56: Outfall No. 68 solute plume at mid ebb on a neap tide

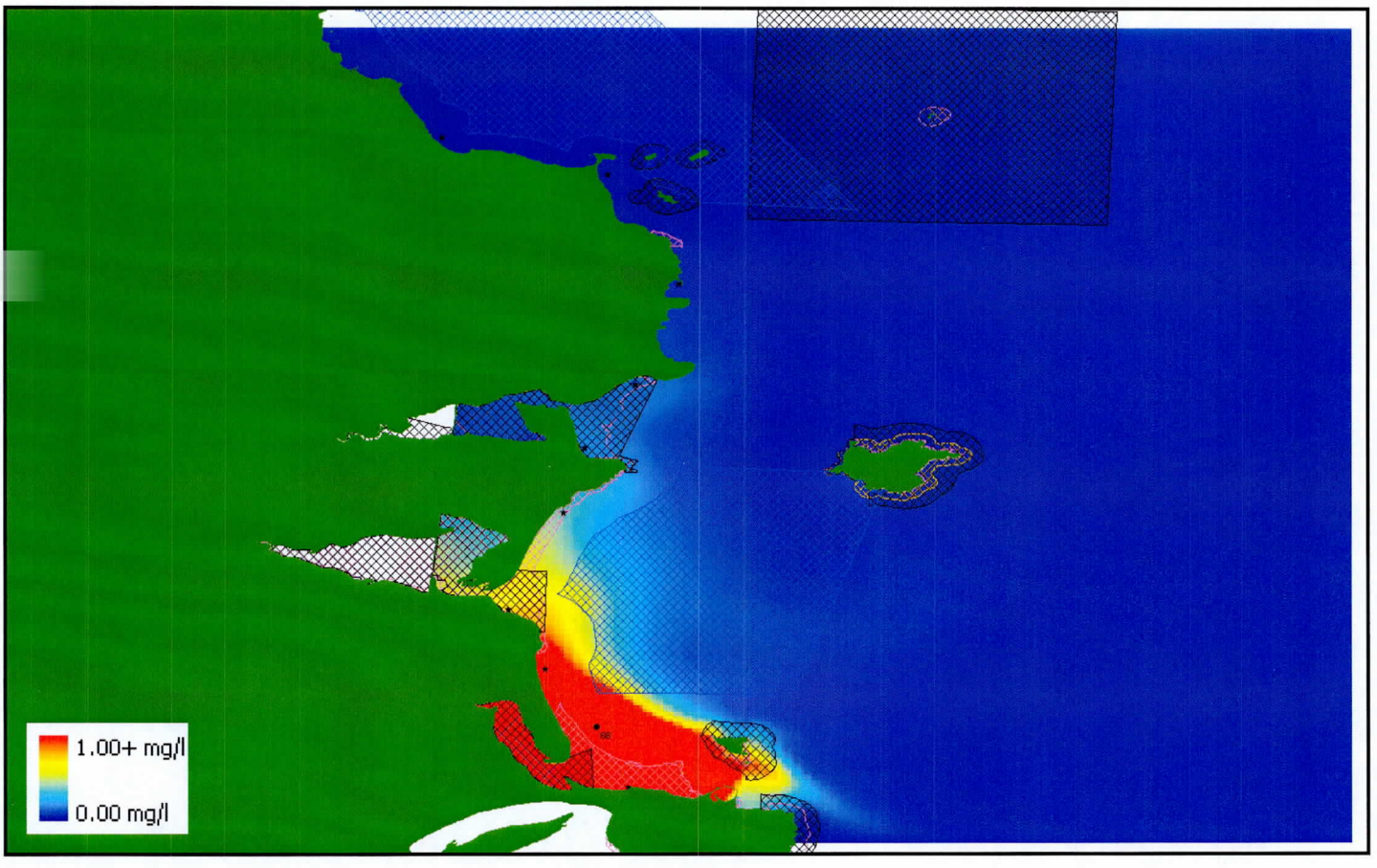


Figure 57: Outfall No. 68 solute plume at low water on a neap tide

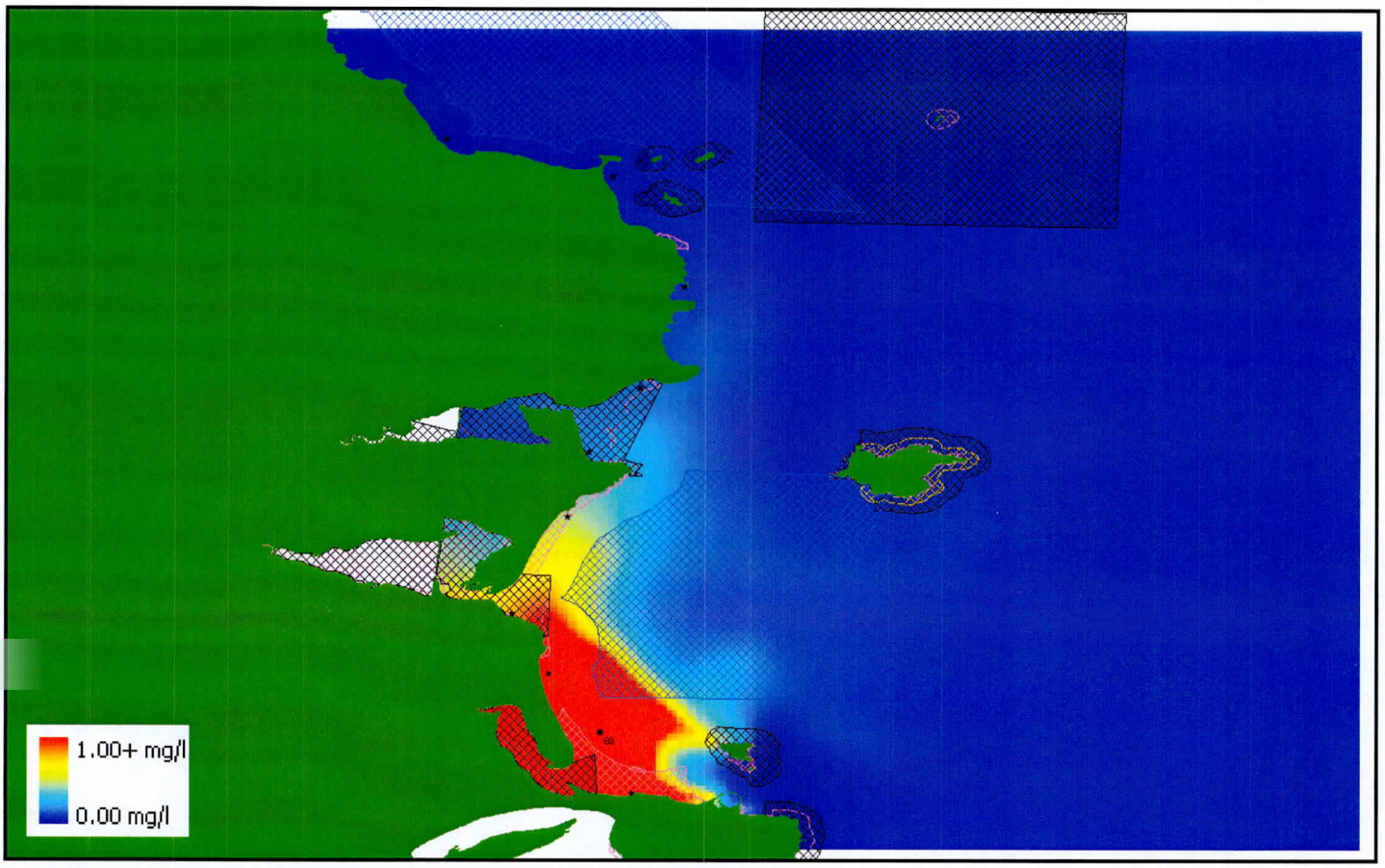


Figure 58: Outfall No. 68 solute plume at mid flood on a neap tide

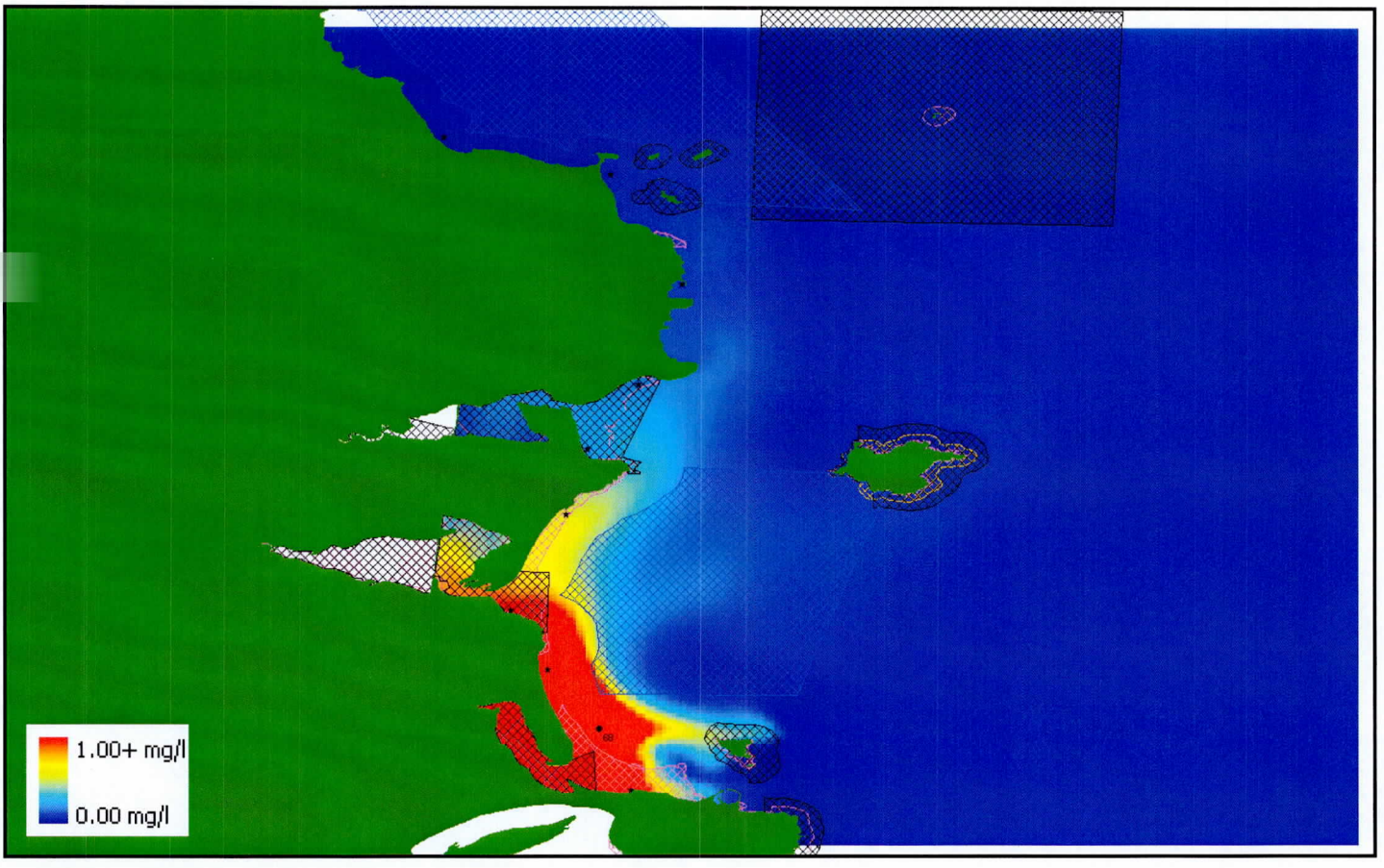


Figure 59: Outfall No. 68 solute plume at high water on a neap tide

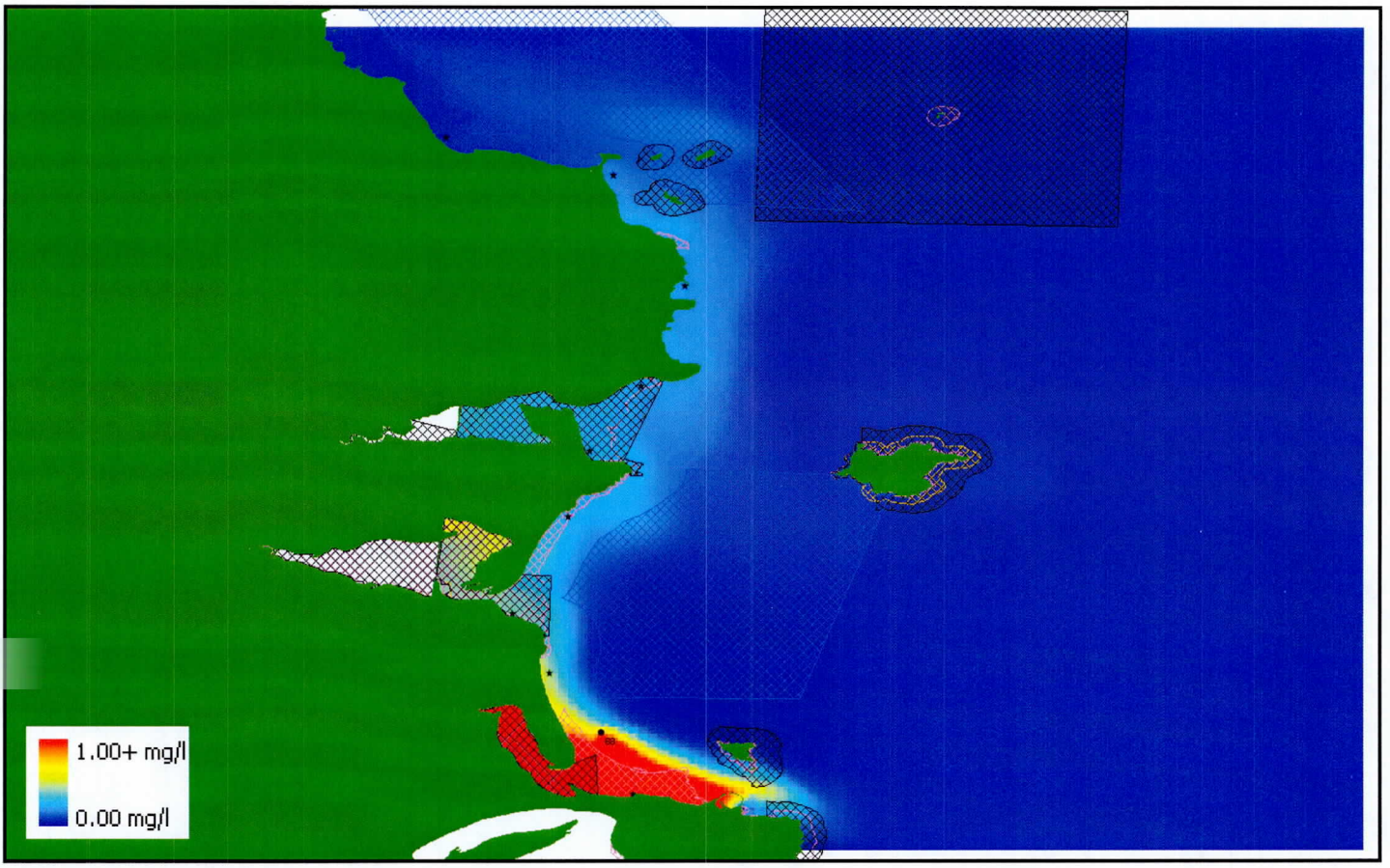


Figure 60: Outfall No. 68 solute plume at mid ebb on a spring tide

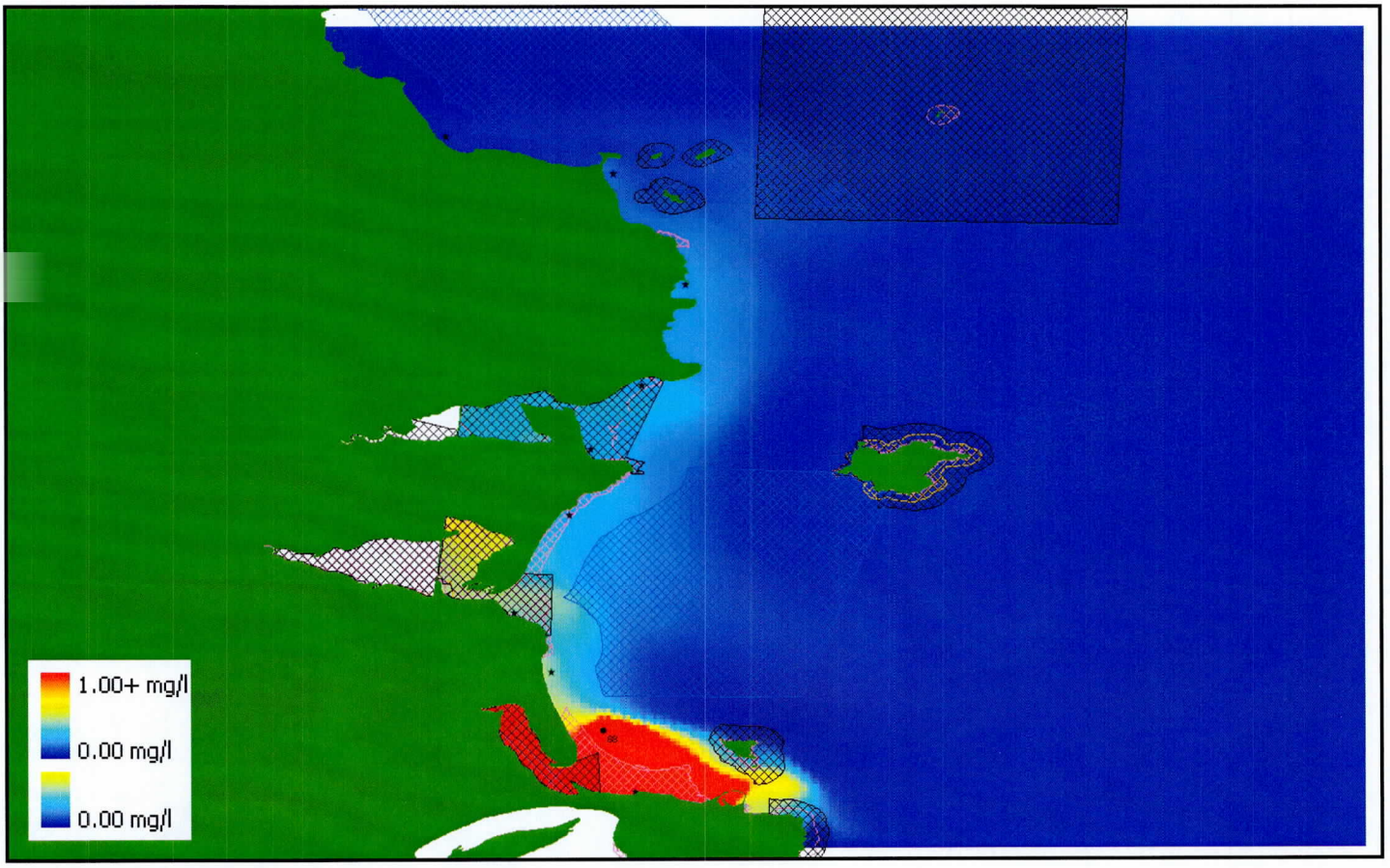


Figure 61: Outfall No. 68 solute plume at low water on a spring tide

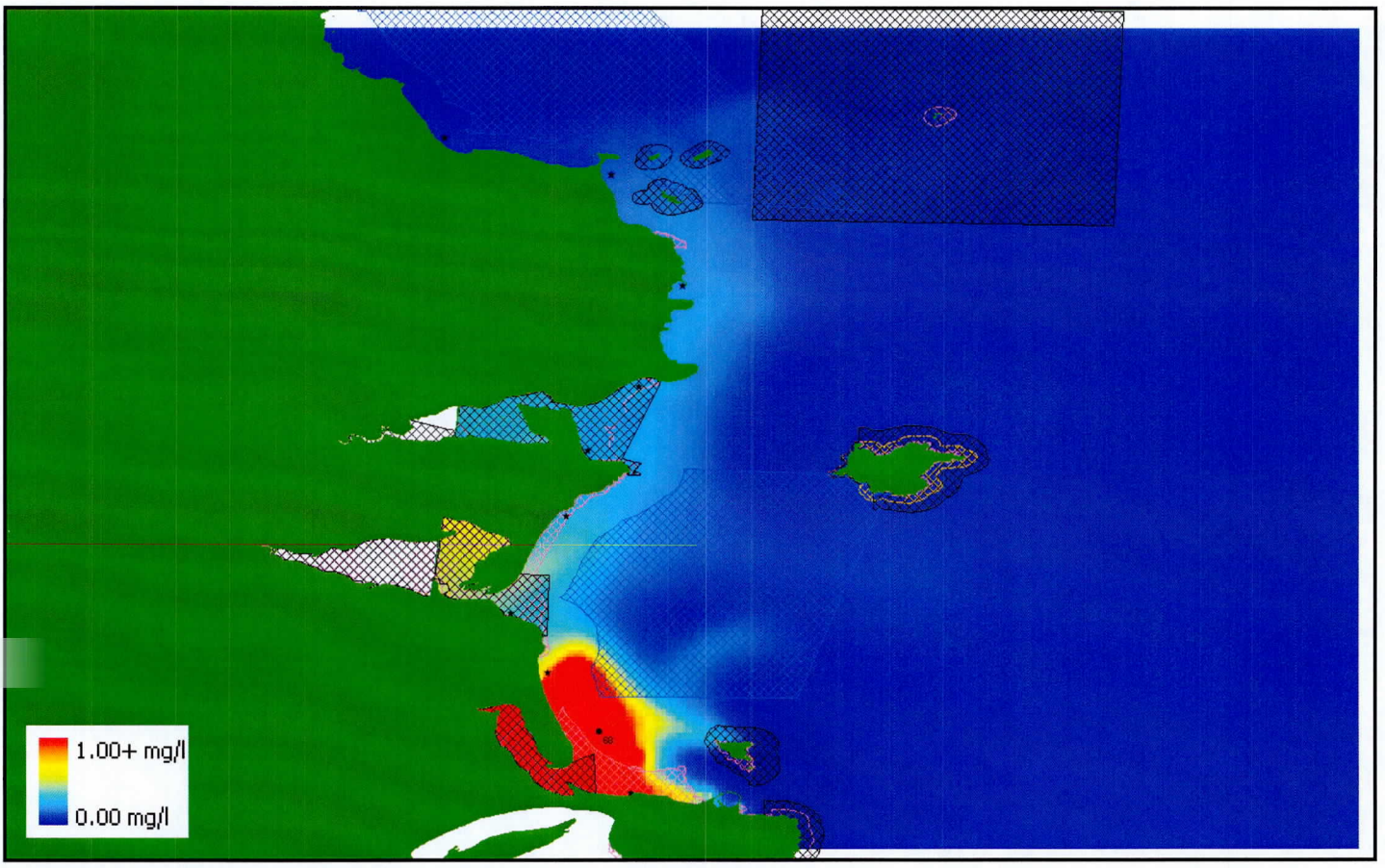


Figure 62: Outfall No. 68 solute plume at mid flood on a spring tide

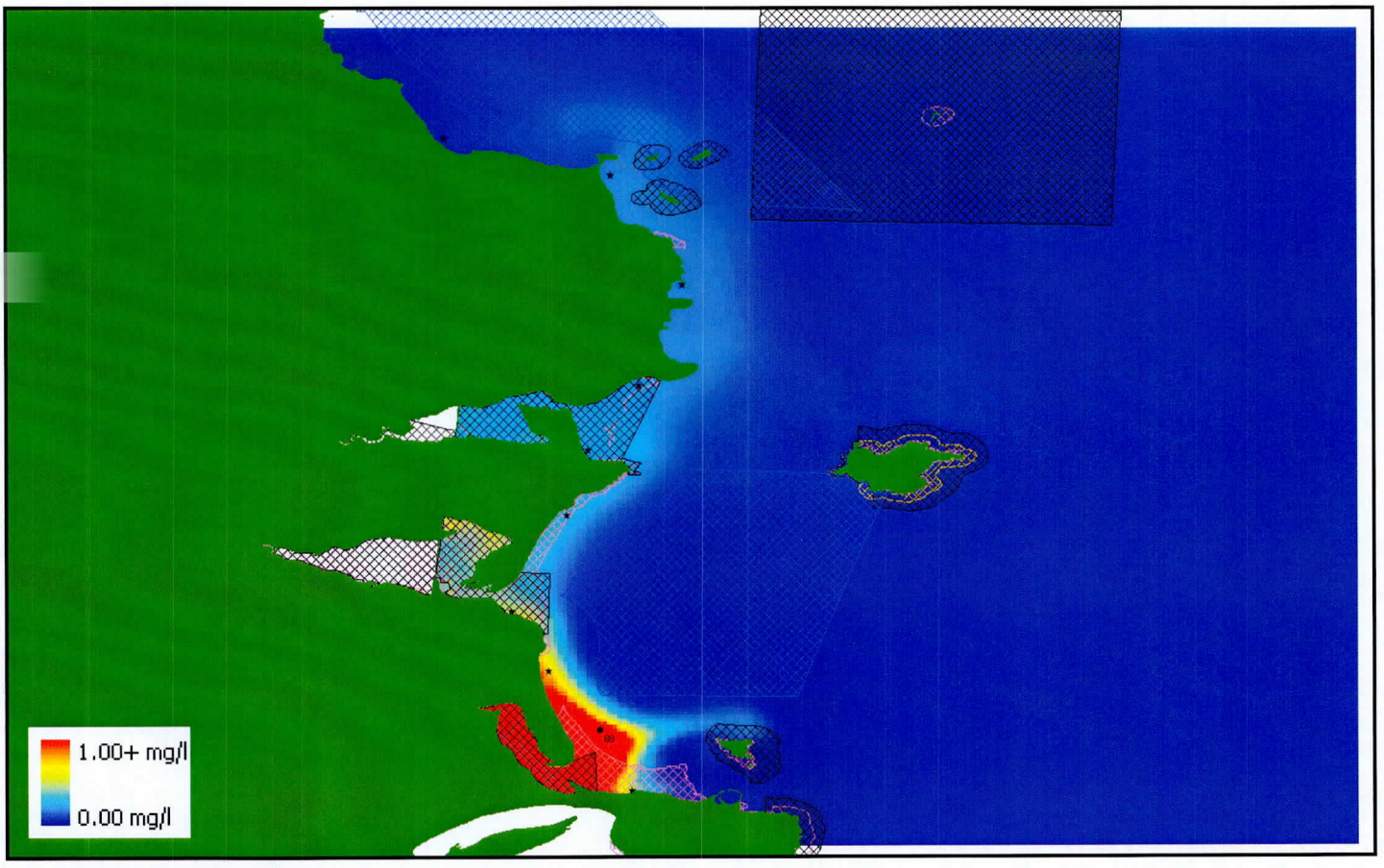


Figure 63: Outfall No. 68 solute plume at high water on a spring tide

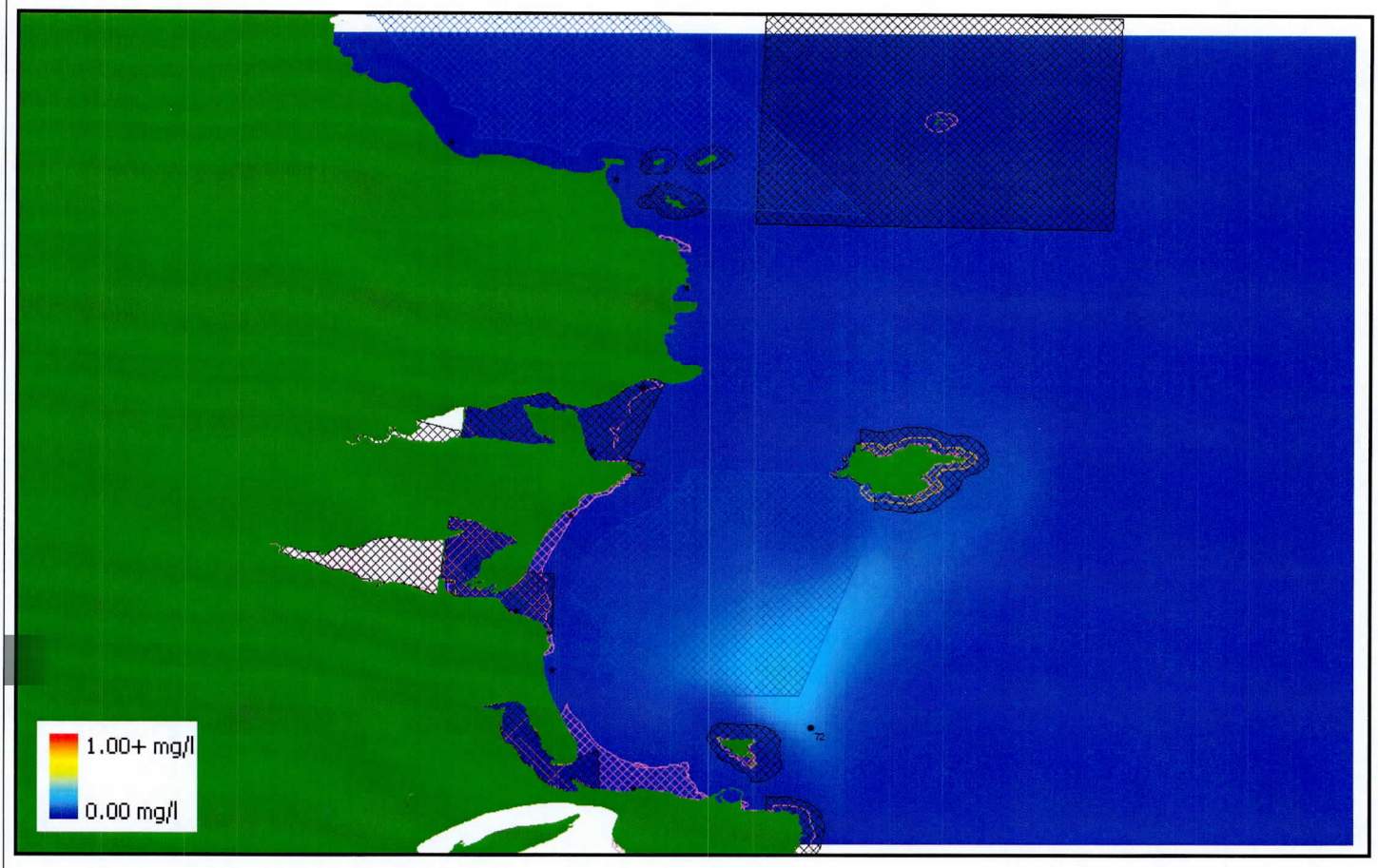


Figure 64: Outfall No. 72 solute plume at mid ebb on a neap tide

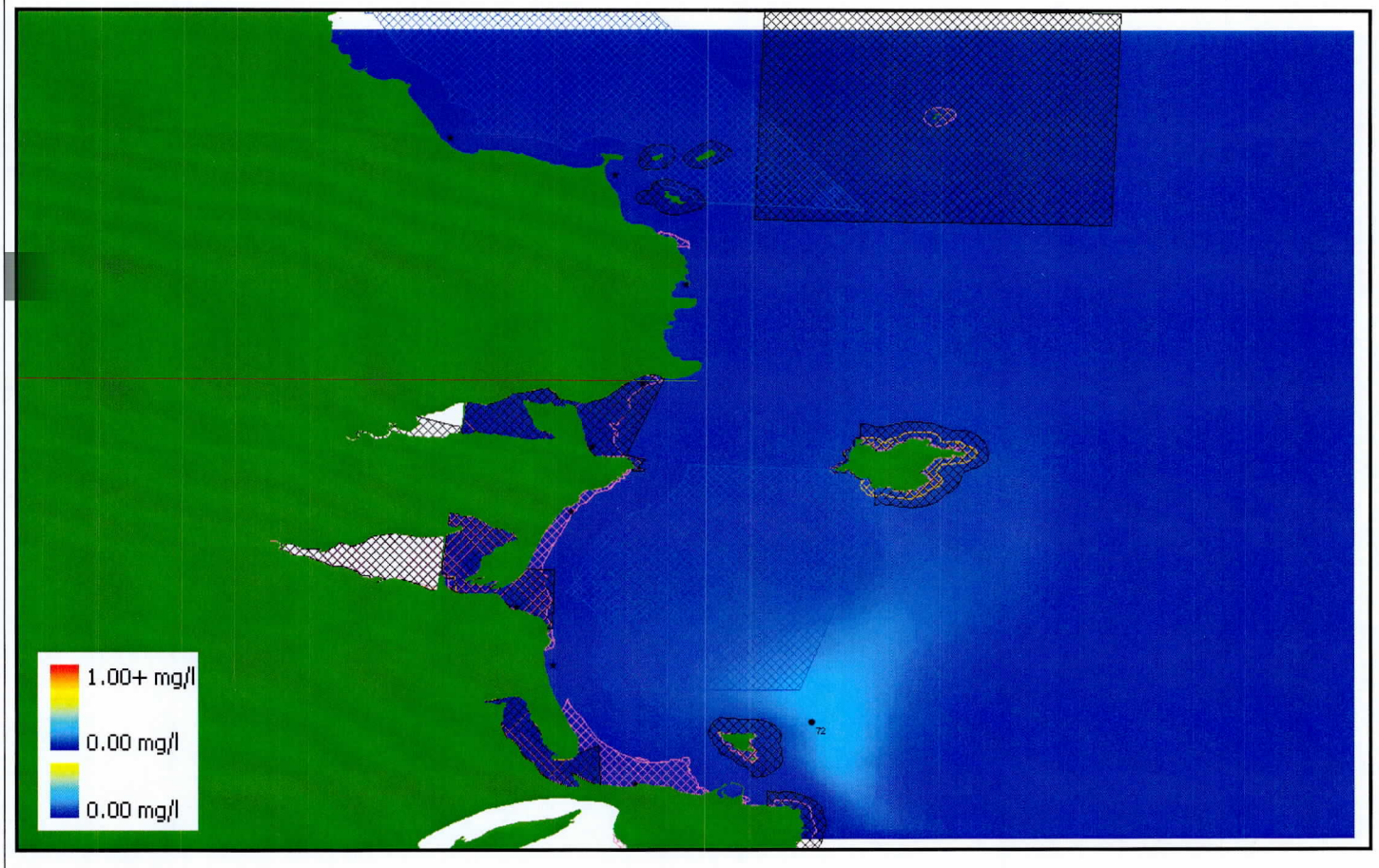


Figure 65: Outfall No. 72 solute plume at low water on a neap tide

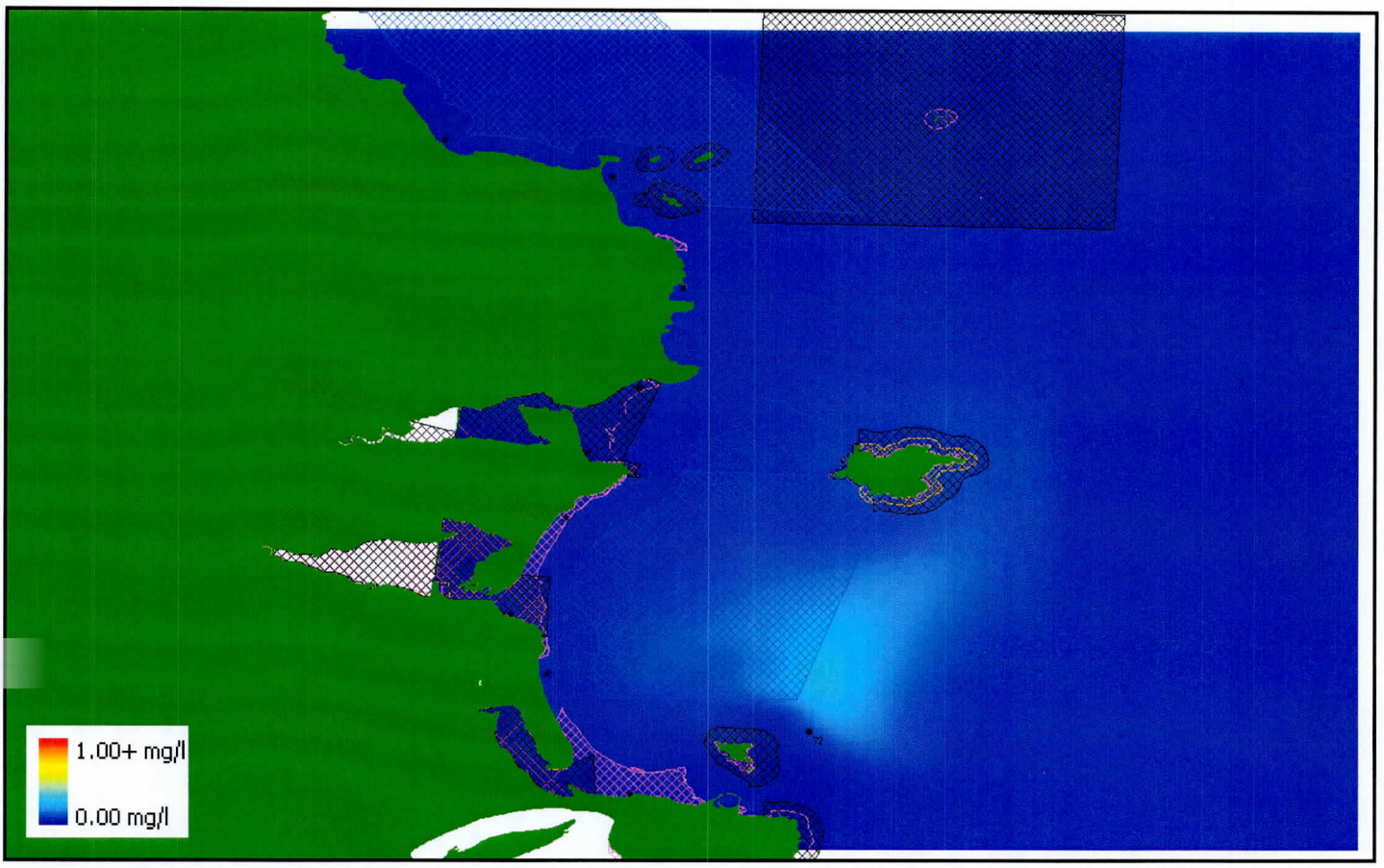


Figure 66: Outfall No. 72 solute plume at mid flood on a neap tide

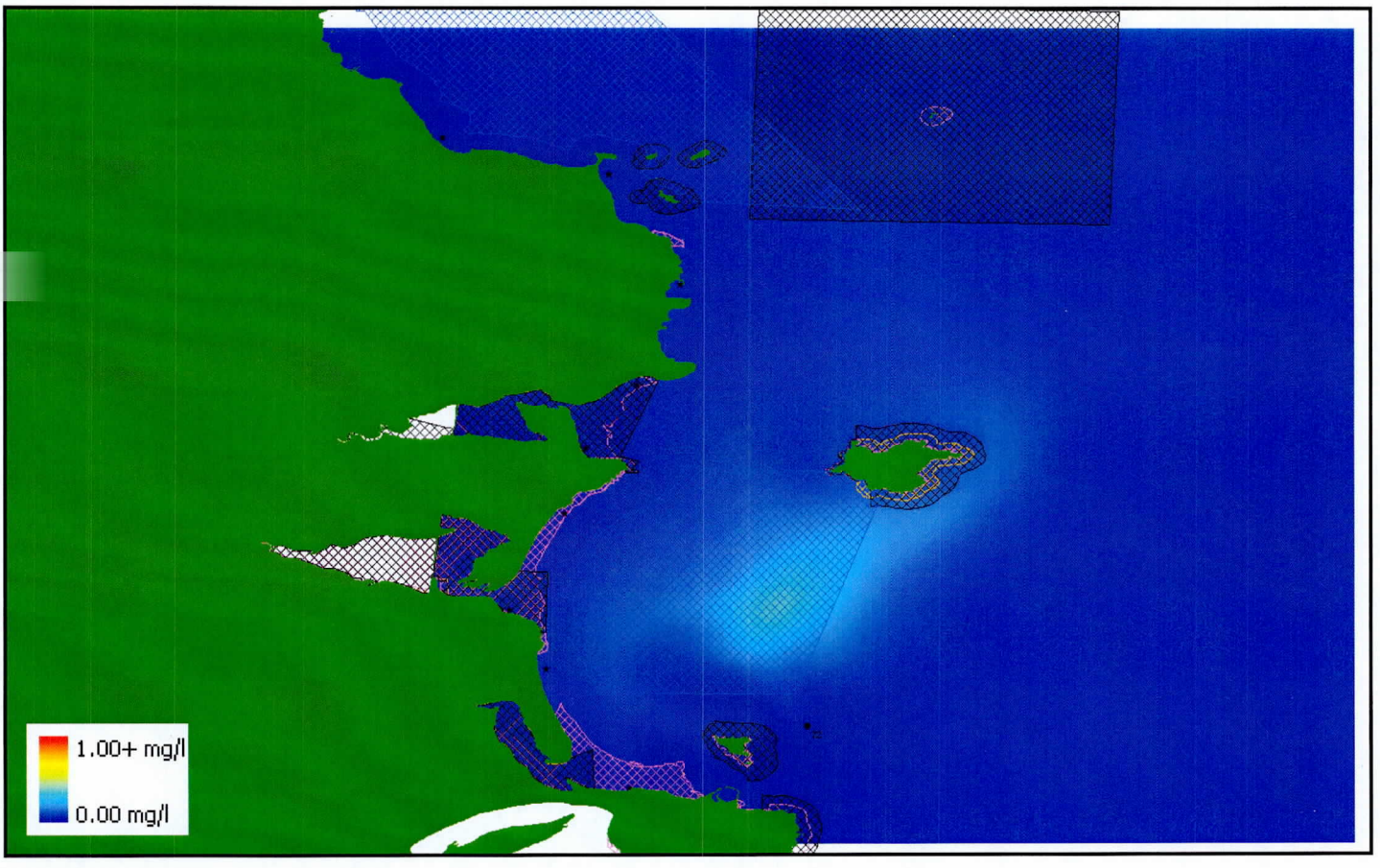


Figure 67: Outfall No. 72 solute plume at high water on a neap tide

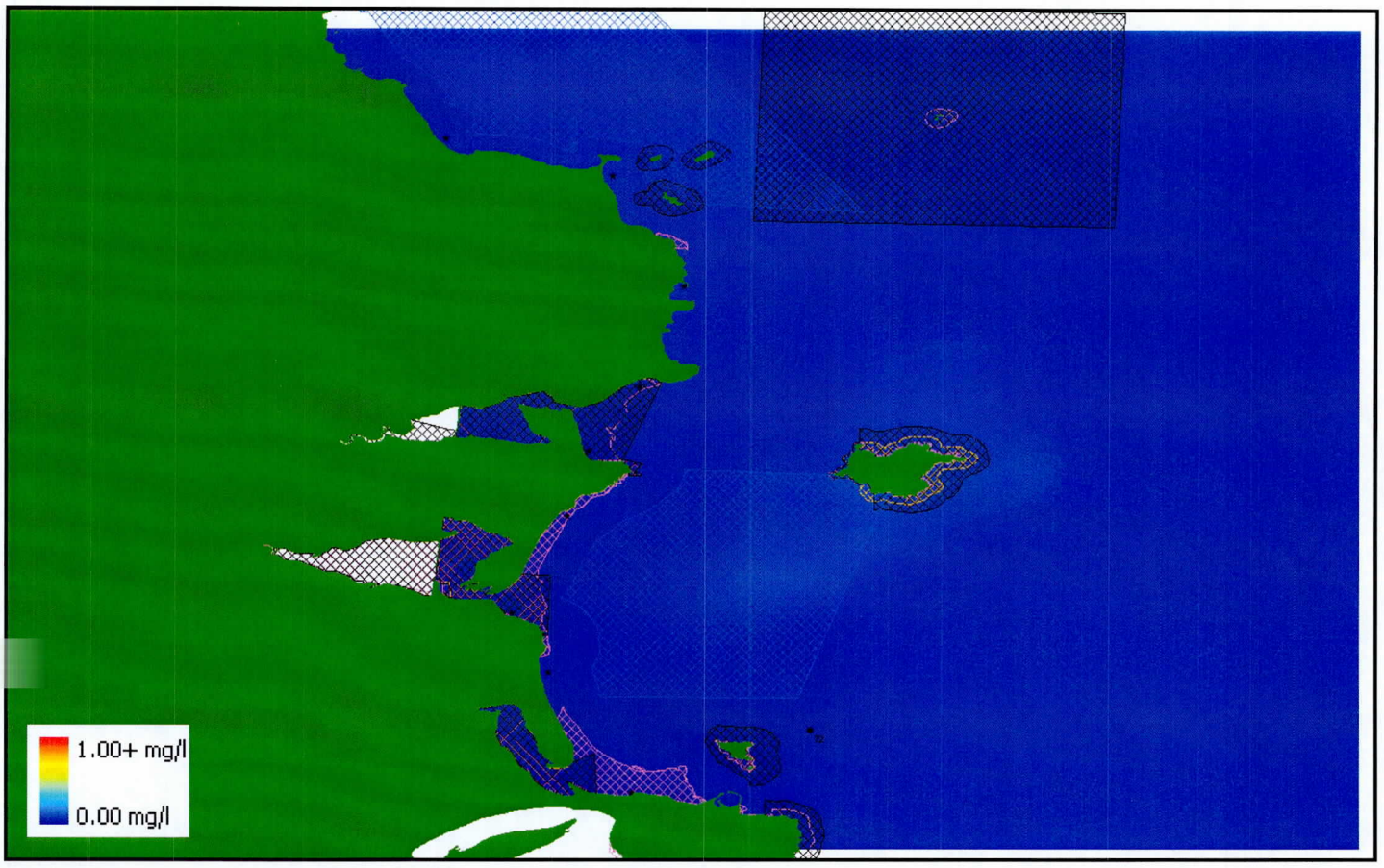


Figure 68: Outfall No. 72 solute plume at mid ebb on a spring tide

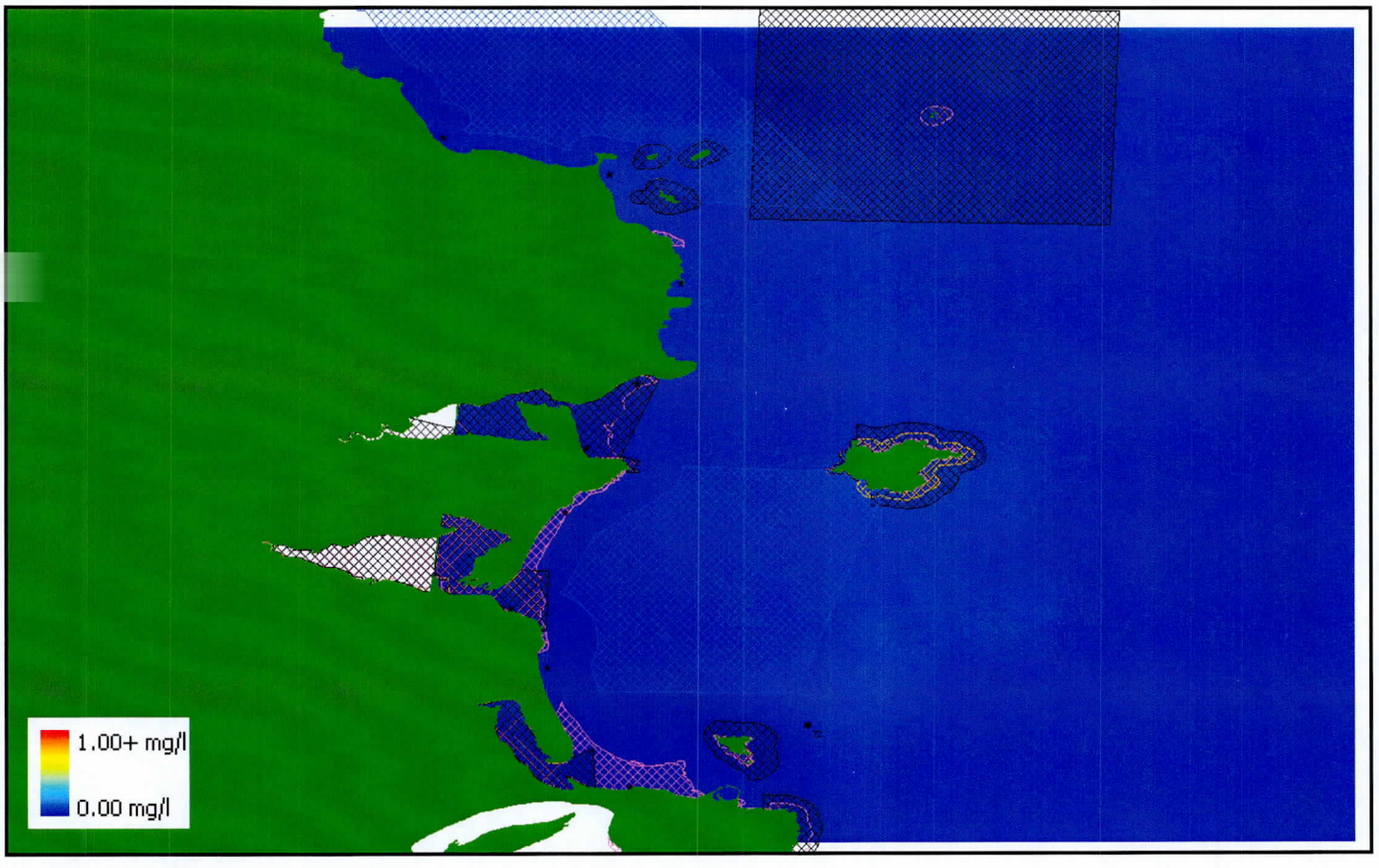


Figure 69: Outfall No. 72 solute plume at low water on a spring tide

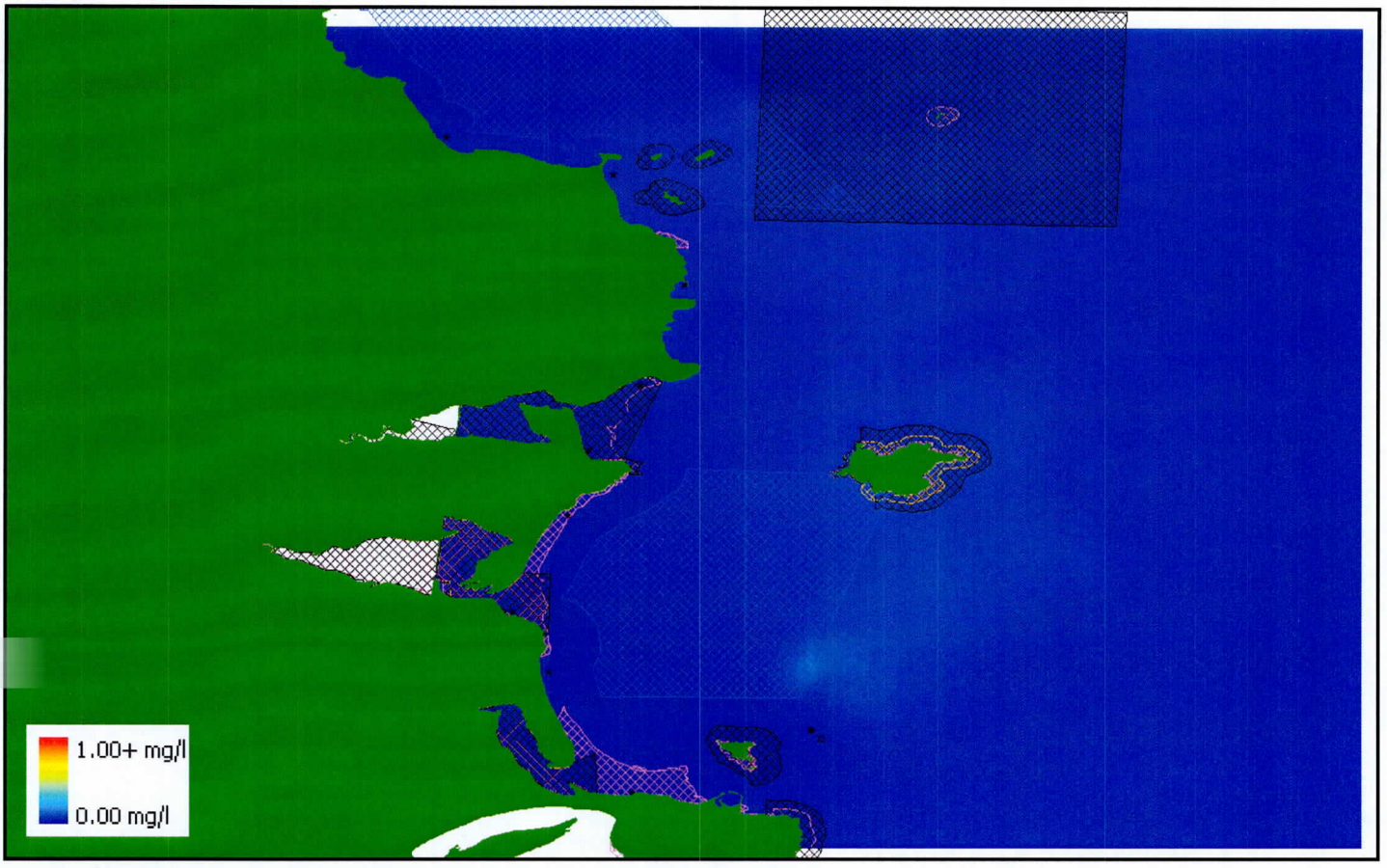


Figure 70: Outfall No. 72 solute plume at mid flood on a spring tide

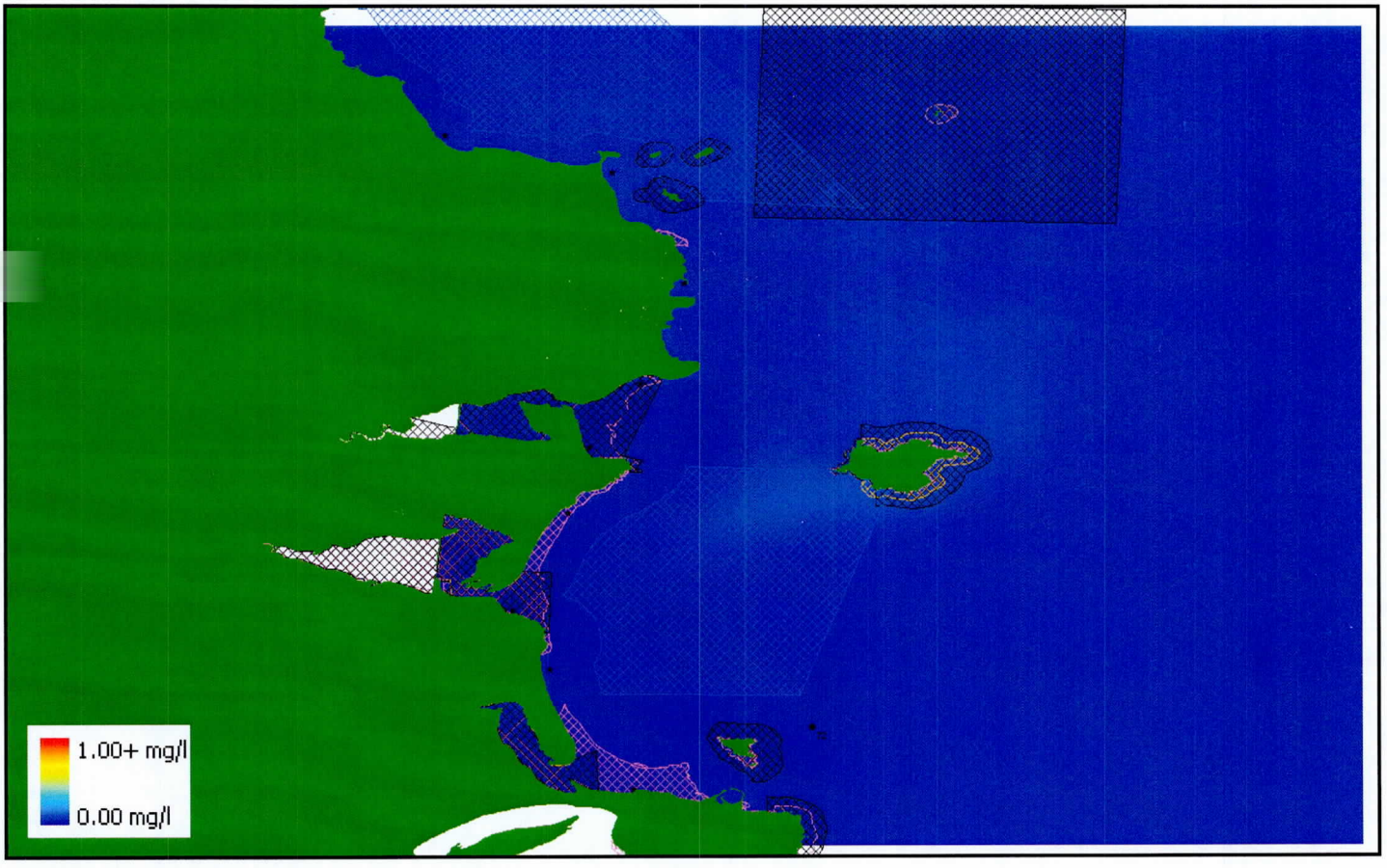


Figure 71: Outfall No. 72 solute plume at high water on a spring tide